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Photo by Robert H. Chapman

Death Valley from Summit of Grapevine Range

VOL. XVII, No. 9 WASHINGTON SEPTEMBER, 1906

THE NATIONAL GEOGRAPHIC MAGAZINE

THE DESERTS OF NEVADA AND THE DEATH VALLEY*

"AND STILL THE DESERT WAITS"

BY ROBERT H. CHAPMAN
U. S. GEOLOGICAL SURVEY

THE area lying to the west and southwest of Salt Lake City and extending to the Sierra Nevada and the ranges east of Los Angeles was for a long time included under the caption "The Great American Desert."

The discovery of gold in California in 1849 was the beginning of the conquest of this thirsty region, the direction of greatest travel being but little south of west from Great Salt Lake to the vicinity of the Donner Pass in the Sierra Nevada, since used by the Central Pacific Railroad in crossing this range. In seeking for better routes to the new El Dorado, parties journeyed southward across the wastes of sand and rock searching for the lower passes which would be perennially available. In this direction the number of mountain ranges to be crossed is largely increased, but by going well southward the great wall of the Sierra Nevada is escaped, though the desert journey is very much lengthened and the hardships encountered by many parties were most appalling.

The desert took frequent toll in the lives of man and beast, and indeed does sometimes today, though the dangers are now comparatively insignificant.

With the discovery of the Comstock mines there came a period of tremendous activity in the search for the precious metals, more particularly for silver, and much of the desert region was traversed by the hardy prospector and his burro. In this way the long distances between watering places were divided by the discovery of springs and "tanks" (natural reservoirs), and gradually this part of the "American Desert" diminished in area and lost some of its fearfulness.

In the 60's and 1871-'72 government expeditions under Lieut. George M. Wheeler traversed several routes across the desert, making topographic sketches and notes of interest and value, but few complete maps were printed. In 1865, and several times since then, the boundary line between Nevada and California was run, which cut through much of the most difficult country. The reports of

*An address to the National Geographic Society, March 24, 1906. Published by permission of the Director of the U. S. Geological Survey.

and the stories by members of these expeditions did not tend to populate the region with great rapidity.

In many instances the prospectors were successful, and the camps of Silver Peak, Lida (or Allida), Reveille, and others sprang up, and had their periods of rise, prosperity, and decline, many becoming completely uninhabited.

During the period of activity many travelers became permanent residents, took to wife dusky maidens from the Indian tribes, and located ranches at various springs and streams, oases in the expanse of waste, where small herds of cattle or horses were maintained.

From the eastward the Mormons pushed gradually away from the streams of southern Utah and established farms and ranches at such places as furnished water, but there is a belt of country one hundred miles or more in width between these points and the water-fed valleys at the foot of the Sierra Nevada, which is almost wholly barren and very dry.

RENEWED INTEREST IN THE DESERTS

During the last few years, beginning with the discovery of valuable ore at Tonopah (in May, 1900), the attack upon the desert has been renewed with great vigor and earnestness, and the efforts of the seeker of Fortune met with so much success and at such widely separated points that it was decided by the officers of the Geological Survey to put parties in the field to make a reconnaissance of some of the unmapped desert area.

The area where work was done lies about 200 miles southeast of Carson City, about 350 miles southwest of Salt Lake, and 250 miles northeast of Los Angeles. It comprises about 8,600 square miles and has a great range in elevation; the highest point reached is 9,500 feet above and the lowest about 300 feet below the level of the sea.

The idea of the person unacquainted with American deserts is of a great plain, sand-covered or rock-littered, with nothing to relieve the monotony of the horizon. As a matter of fact, these great areas include mountain ranges, high plateaux, mesas, and buttes, extensive valleys, that in the clear air seem but a short distance across. Many of these valleys are "closed"—have no outlet—and the lowest pass from one to another is often many hundred feet above the valley floor. The flowing streams are very few, the springs far between, and water a commodity for which men search, often with life at stake.

The map includes an area, almost equal to the total area of Delaware and Rhode Island, of 3,000 square miles that is waterless except for small holes that may be filled by occasional rains.

LIFE IN GOLDFIELD, NEVADA

In entering the desert area the party traveled by rail to Tonopah, and thence by auto to Goldfield, which a short time ago was but a cluster of tents, and here headquarters camp was established. The town lies at an elevation of 5,700 feet, in a basin between the foot of Columbia Mountain and a mesa edge several hundred feet high. The immediate vicinity is not of great ruggedness, differences of 800 feet being extreme, though eight miles westward the Montezuma Peak rises to a height of 8,400 feet above sea.

Since January, 1905, the town, together with its sister, Columbia, has "boomed" and quieted, and been "born again" to a steady, healthy growth. The demands of business are such as to warrant the erection of substantial buildings of wood and stone; there is at least one church, an ice plant, swimming pool, a brewery, a club; pipe lines bring water from distant springs, and there are the numerous sources of amusement common to all new mining camps; every bar and hotel has its roulette wheel and corps of players, "cappers," etc. Here one may eat most of the dainties of the season—fruits from California, vegetables from Utah, fresh meat from Chicago; he may drink almost any brand of wine or any mixture of liquors to be found anywhere, while selections from the latest operas are rendered on violins and piano. One meets

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men from every part of the globe—prospectors from Alaska, mining engineers from London and Africa, business men from every large city, and the burros, "angels" of the desert, are universally present. There are numerous mines producing ore, some of which is shipped for treatment, some crushed in local "custom" mills, and some by mills controlled and operated by the owners of the mines. (Gasoline is used for power in most cases; wood retails at $18.00 per cord.)

Insurance is unknown, regular companies declining the risk. On a windy day in July (8th, 1905) a fire was started which destroyed several blocks of tents and buildings. It is a matter of interest that at least one building was saved by using beer to prevent its igniting; the bottles were thrown against the building as modern grenades are used. One week later the town of Columbia was severely damaged by fire, the roaring flames, flying sparks, with pyrotechnic explosions of dynamite, making a scene to be remembered.

It is the dustiest vicinity I have seen, and when one of the many "twisters" (cyclones often of no mean proportion) strikes one, he can only "shut up" everything about himself and do no breathing until it goes by.

Provisions are high priced and hay worth 2 cents to 3 cents per pound.

With the advent of the railroad in Goldfield, and from this point to outlying camps, the means of transportation is varied—for the passenger the modern high-power automobile or the more primitive stage-coach. For freight supplies of all kinds for man and beast, traction engines hauling trains of wagons, or several coupled wagons drawn by six to eighteen horses or mules, are used.

Nowhere in the world can one find greater contrasts than in this region. But a few miles from town one may ride or drive for hours—perhaps days—without meeting a human being, his eyes aching with the brazen glare and the monotony of the billowing hills and mountains, which hours of travel seem to bring no nearer.

THE STONEWALL FLAT

From Goldfield the work of mapping takes us to the eastward, away from the auto and freight roads to Bullfrog and the southern camps. Across the Stonewall flat—a great inclosed valley, with its playa bottom of baked mud as hard and as smooth as concrete and as white as snow—to the Cactus Range, which extends in a northwest-southeast direction, with a rugged rock cone at the north end, known as Cactus Peak, which is a landmark for an area of a thousand square miles. An example of the uselessness of the maps of the region is here apparent; all these show the Cactus Peak to be to the south of Cactus Spring, which is the first water east of and 25 miles from Goldfield, while in reality the water is eight miles south of the mountain. This spring we find to be high in the range, and in this it is typical. Palatable water is seldom found in the flats or valleys unless sought by wells of considerable depth (100 to 200 feet). This range is made up of a series of volcanic flows, and near the Cactus Spring we find a fine example of basalt or rhyolite, columnar structure, lying like cordwood beside the road.

The Cactus Range is separated from the Kawich Range by a great valley, like that of Stonewall, long slopes of gravel and drift reaching from the ranges to the flats in the middle, which, as looked upon during the day, swing, rise and fall, in hazy heat waves like the billows of the sea. Toward the north end of the Kawich Range, at the new townsite of Silverbow, we find a stream of running water, and we push on to get above the camp and pitch our tents below the ragged cliffs.

At Silverbow and vicinity there are several hundred men, a few women, many good prospects, and much hope. The place is about as comfortable as any in the region, but desert prices prevail; hay is worth $80.00 per ton in bulk and grain $5.00 per sack (of 75 pounds).

The Death Valley Region, Nevada

To the east is the trail to "Eden," which we follow, crossing the Kawich Range, the highest peak of which is 9,500 feet.

From the pass we look along the summit, which is flat and broad—the remnant of an old surface which has been much eroded. We find the "town" to be a scattering lot of tents, but aptly named, for there is a small creek of running water, green, fresh grass, willows and small cottonwood trees, rose bushes, ferns, and grateful shade. The first man we greet states his name to be Adam(s), and asks us if we have seen any snakes, of which he assures us there are plenty, but Eve and apples we do not find.

The prospectors here show us claims, some having ores of gold and others of rich silver. We spend some days in mapping this country and examining the rocks, and then take up our journey southward along the range, which is usually supplied with timber, springs, and grass. Here there are numerous bands of horses, some of them wild, others acquiring wildness, and in turn endeavoring to thrust wildness upon the beasts of the traveler(three of ours strayed and are not even yet recovered). At one spring seven dead animals are found, killed by the shots of the stock-owners, who wish the water for beasts of use and value. Like the Cactus, this range is largely made up of volcanic flows.

We cross the Kawich Range on the pass above the "Wild Rose" Spring, and camp at the Sumner Spring, where there is water and wood, and after removing various rats, gophers, and insects from the spring, we are well located, with a beautiful view of the Reveille Range, which rises 3,000 feet above the valley to the eastward. In the desert it is very difficult to get satisfactory photographs—the distances are so great that the picture may include a whole range, miles away and several thousand feet high, but there is nothing to give scale to the view—nothing by which one can measure it. In the Reveille and adjacent valleys antelope are sometimes seen, but animal life is not abundant.

From Sumner Spring we journey by buckboard to the Reveille Range, which is crossed by the steepest wagon road I have ever seen. Over this road the ores from the mining camp, Old Reveille, were hauled to the mill in the valley, 16 miles away.

At the top of the mountain we look across another rolling summit of volcanic rocks; near by are a few buildings, a new boarding house, and several wooden shelters. Here "outside" capital is interested in the development of "prospects;" the water is hauled four miles, from the spring at the "Old Camp," which thirty years ago was a busy town, but now going to decay.

Horses and mules unaccustomed to the region are afraid of the deserts, and it is often very difficult to get them started over an unknown road when leaving a good campground behind; a nerve-wrecking delay may follow and heroic measures become necessary. Some of our animals lay "hog tied" in the cooking sun for hours before proceeding over a new route.

KAWICH—A GOLD CAMP

While the northern end of the Kawich Range is well supplied with water, grass, and trees, the southern part is dry and barren. Here, about 80 miles from Goldfield, at the foot of Quartzite Mountain, some of the ledges of rhyolite which show through the drift carry gold, and as this is the magician that turns a desolate waste into a semblance of civilization, we find a camp, complete, yet lacking everything. The description of an investor from Italy I quote: "Kawich is a h—ll of a place! No mines, no water, no feed, no women," which discloses one point of view.

The water is hauled by team from Cliff Springs, 12 miles away, making a journey of 25 miles a day to keep the town from drying up, and is sold at $3.00 per barrel. (Extensive bathing is not generally practiced.) If this spring fails,

the wagons go to the Wild Rose Spring, 16 miles distant.

At the Gold Reed Mine we see some very beautiful gold ore; the metal occurs in a ledge of rhyolite which is highly silicified, and there is so much of it that none need ask to see it.

The Belted Range lies east of the Kawich Valley. It is composed of volcanic rocks, which weather in cliff forms that are very beautiful, many reaching 1,500 feet in height. Many rocks show columnar structure, horizontal, curved, and vertical, when looked at more closely.

The valley at Kawich extends southward many miles, and then rises to a high table-land which breaks abruptly to the south, forming a mesa front. To the eastward the Belted Range runs about north and south, and where it joins the mesa land the Oak Spring lies. A butte known as Oak Spring Butte rises just north of this water—a landmark; it is at once an aggravation and a comfort to the traveler, as he can see it for miles, and journey apparently toward it, circle around it, but not reach it.

Oak Springs is about sixty miles by wagon road from Kawich, with but one small spring between and a road heavy with sand. It is a wearying journey at best, and men and animals are glad indeed when camp is pitched. Here there are prospects of gold and of copper; azurite fine enough to be cut and set in jewelry is found, and some of it has been shipped for that purpose.

From the top of the Oak Spring Butte a panorama of interest unfolds: To the west and north the high plateau region, besprinkled with scattering cedar and piñon trees, cut by sharp-walled canyons, and limited by the backbone of the Belted Range is one of the most arid parts of the desert. To the east and south is the long sweep of an unnamed valley, the slopes of drift reaching from rock-walled range to the white enamel lake bed far in the distance. Across this valley we journey. The road, often sandy and slow, is relieved by stretches hard and smooth, which are in themselves a rest to horse and rider. In the bottom we find a great tank of water; it resembles a stream without flow, head, or mouth. The water surface is perhaps 200 yards long, 2 to 5 yards wide, and has a maximum depth of 3 feet. We are fortunate in that a fierce thunderstorm with heavy rain passed a day or so before and filled this reservoir, which had been dry for months, to overflowing. The water is already dark brown and alkaline, but we fill every canteen and barrel and journey onward for the next permanent water.

The road rises slowly to pass between low buttes, and we find ourselves surrounded by giant yucca, or Joshua, trees; some of them are large and spreading, but give little more shade than a barbed-wire fence.

When we reach the Cane Spring, one of the watering places on the old emigrant road—when to reach it from the north a dry journey of 70 miles was necessary—it has taken us three days from Oak Springs, and the distance is not more than 35 miles. Here the tired, emaciated horses rest, wander in the barren hills seeking grass and finding sage brush, greasewood, and creosote bush.

Grain, which should have reached us, has not come, and we are distressed and worried lest more animals die and leave us stranded. We estimate it is 40 miles to the nearest hay—at a stage station on the freight road from Las Vegas to Bullfrog. We choose a light wagon, the four freshest animals, and succeed in getting back with a few bales in time to keep our bony quadrupeds from starvation.

For many weeks we have been skirting the edge of the area indicated as dry. It has been necessary to make small shelter camps far within the area and to haul water many miles across the trackless flats.

There are quite a number of animals that leave tracks and marks near the water-holes. During certain months thousands of wild doves flock from desert flat or bench land to spring or tank. These flights and rabbit trails converging toward a single point are of great as-

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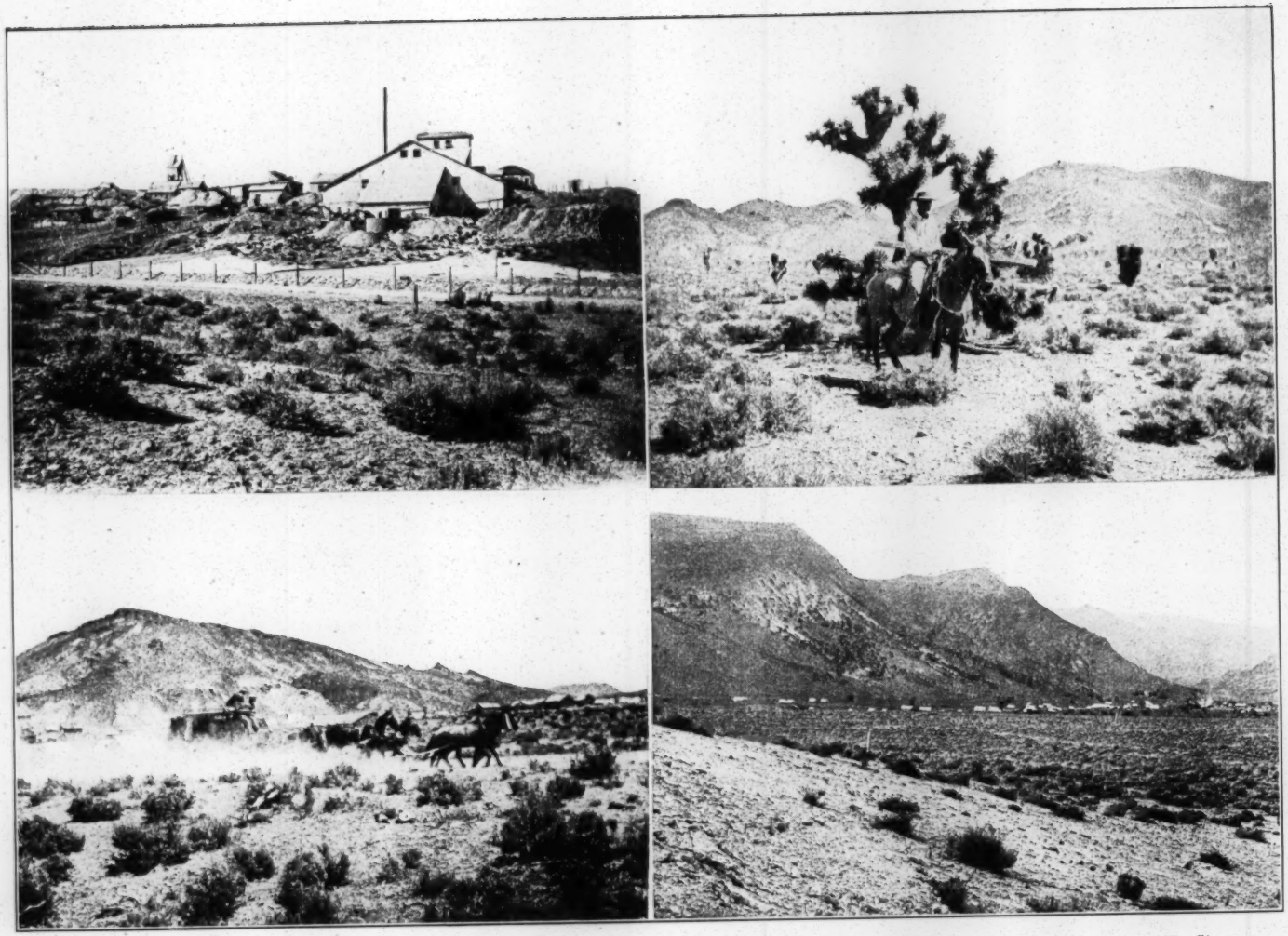

Photo by Robert H. Chapman

The Combination Mill at Goldfield
Traveling by Coach through the Desert

Giant Yucca or Joshua Tree
Silverbow, a New Camp

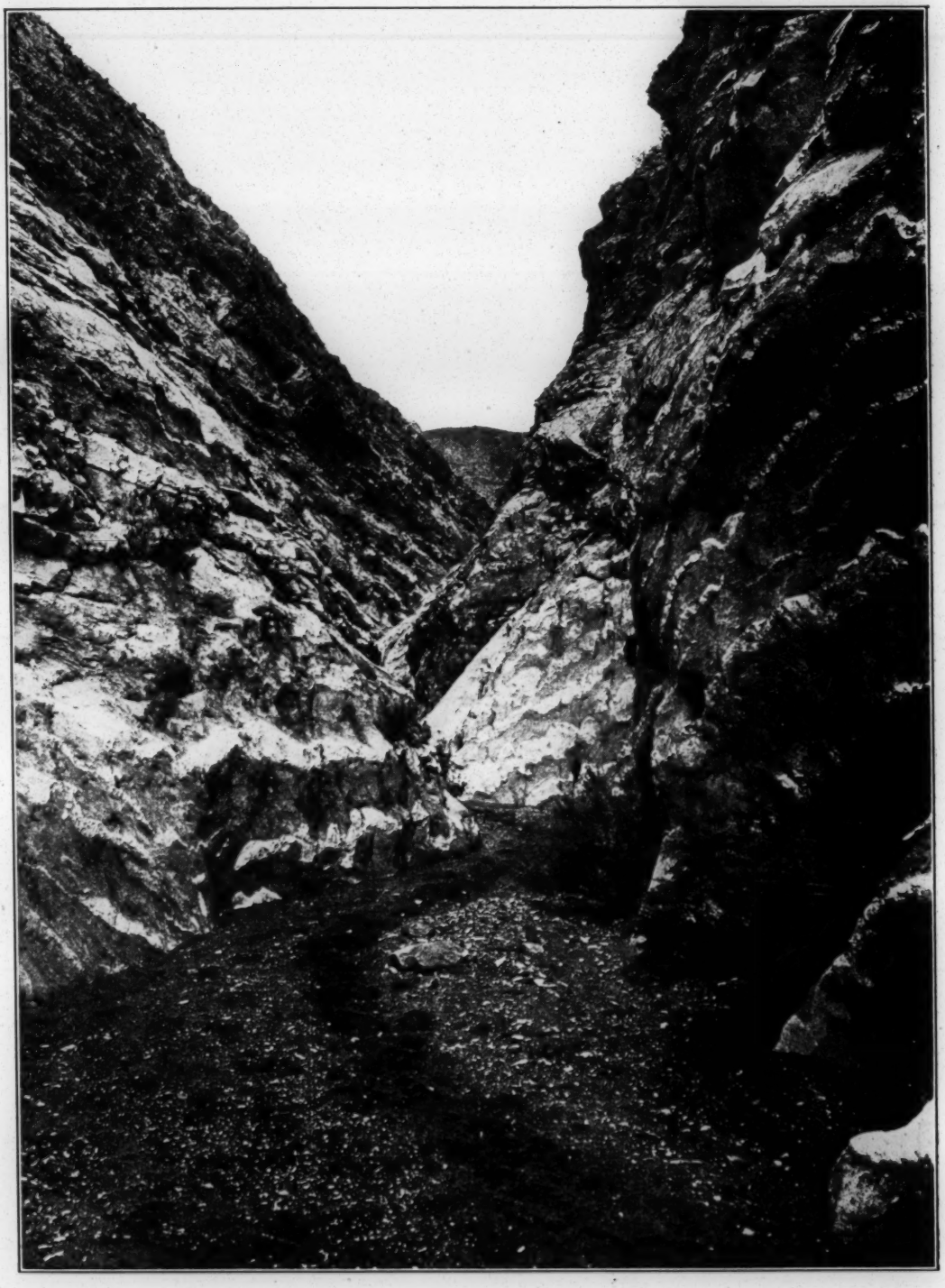

Photo by Robert H. Chapman

Marble Canyon

Route of old trail to Owens Lake Valley

sistance to one in search of water. Humans use many devices—usually heaps of stones or cairns or small sticks placed as pointers; these may be of great comfort or encouragement, though if the tank proves dried up, or to have been emptied by some wandering prospector to save his burros and fill his canteen, much distress and anxiety may follow.

From the Cane Spring we turn westward, and the Grapevine Range before us rises 3,000 feet from the Amargosa Desert—a great sand dune, long a landmark to the traveler from Ash Meadows to Beatty Ranch—stands in the desert, which has heretofore claimed more than one victim. Before turning our faces toward Death Valley we proceed across the sloping plane to Bullfrog to replenish our food, overhaul our outfit, tighten water barrels, repair canteens, and arrange for forage which is to be hauled to us.

The towns of Bullfrog and Rhyolite are practically one, while Beatty is four miles east. The latter is situated on the Amargosa River, a small stream, but usually one has to dig to find it. I can give no figures as to population, for the inhabitants in most camps are a drifting lot—there may be many hundred, even a few thousand, one day, and soon afterward but a handful, as new strikes are made in outlying districts. At Bullfrog we find rendezvous camp which has been brought from Goldfield; as we pass up the street we find the omnipresent tent, a few adobes, and one house built of beer bottles set in mud. (These materials are the only inexpensive ones to be had.) At the head of the street rises Busch Mountain, one of the many peaks surrounding the camp, its sides scarred with the waste from prospect holes. One of our first experiences is to take a swim in a tank of goodly proportions fed by clear green water brought many miles in pipes. It is useless to try to express the joy and delight which comes in sporting and romping in the water, while parched bodies absorb the fluid until we are exhilarated as by a strong stimulant. It is our first wetting in—I blush to say how long! At Beatty we find a modern hotel with a wonderful variety of refreshment, solid and fluid, served to a nicety, including hammered-brass finger bowls, by men in conventional black evening clothes.

We look southward across the Amargosa Desert, stretching farther and farther until lost in the blue and amber of miles of heat with glittering sand and mud flats, flanked by the Bare and the Grapevine ranges, with the high peaks of the Funeral Range appearing beyond.

From Bullfrog the route lies across an extension of the Amargosa Desert to the Grapevine Range, to reach which we pass from arid Nevada into California, which here is hardly so luxuriant in foliage as its reputation might lead a stranger to anticipate, and at a boundary-line post set up for work.

THE DEATH VALLEY

Twelve miles southwest camp is made at the Daylight Springs, on the crest of the divide between the Amargosa Desert and Death Valley. We journey to one of the high peaks of the Grapevine and look into the "Valley of the Shadow of Death," as desolate a view as may be found.

In the distance the Telescope Range rises to an elevation of nearly 11,000 feet, while at our feet the salt-white plain is more than 6,000 feet below us and well below sea-level. The flat is 25 miles away, and on its borders not a vestige of vegetation appears. The valley was named Death Valley from the loss of members of parties of emigrants who attempted to pass through it in 1849, and since then a number of persons have been lost, keeping up the sinister record as a graveyard, but the appalling stories of the number of persons perishing there each year are exaggerated. It is not safe to go into Death Valley for active work during July, August, and September, though there are persons who remain there all summer; but in October we journey from Daylight Spring down hill,

mile upon mile. A sign painted upon a box lid stuck into a pile of stones gives us the cheerful assurance that we may be well provided for if we are found; it reads: "Rhyolite Undertaking Company, funeral directors and embalmers."

The canyon walls rise above us, not high, but sharp and steep, and it is only by turning and looking backward that we appreciate the greatness of the range we have crossed. The grade is easy, the road wide, sandy and gravelly, our horses grow weary and move with deliberation; all are oppressed with the feeling of weariness and lassitude.

We ride from the canyon mouth to the edge of a sandy plain, and here, 115 feet below sea-level, find a couple of holes, 5 feet in diameter and about as deep, with two feet of water in them. This is the "Stovepipe" Spring, so named from the fact that it was long marked by a section or two of that useful flue, placed upright, to inform the wayfarer where to dig when the holes had been filled by drifting sands hurled forward by the furious gales, burying deeper and deeper all vestiges of the water so necessary to life itself. We are indeed in *the* Valley; around us the sand drifts in little sheets; here and there a surface of broken and ragged saline material, hard and as rough as though made of giant saws set with teeth edge up.

We turn to the eastward; in the foreground the gritty beds of conglomerate and hard clays show as low hills backed by the ragged cliffs of the Grapevine, banded, rugged and grim. To the northward the cliffs and peaks guard this valley of desolation, the long delta fans of drift material spreading like great hands from the mouth of each canyon, burying from sight all vestige of the underlying rock, each a silent witness of the cloudbursts, which sometimes come roaring down the rock-bound clefts, to spread and evaporate like magic in the fierce rays of the sun. The farthest fan marks the mouth of Titus Canyon, named for the young Coloradan who left Bullfrog about the time we reached Goldfield, and perished in its lower reaches seeking life, as attested by the message penciled upon a sliver of stick broken from a provision box and left sticking in the sand for the guidance of his companion: "Have gone down canyon looking for the spring; have been waiting for you.—TITUS." His remains were found; those of the friend are still resting undiscovered.

Across the flat we journey, our light vehicle loaded to its limit with food, forage, and water, the mules weary before starting.

Dunes surround us, 20 to 30 feet high, representing the struggle of plant life to keep its branches above the accumulating drift and its roots near enough water. The victory is eventually with the sand, into which wheels and hoofs sink nearly a foot, or when a harder surface is found it breaks like crusted snow, letting the beasts into a soft substance which they dislike exceedingly. Through such ground we can move but a few yards without stopping.

In places great boulders obstruct the trail, among them the wagon must twist and turn through the fickle and shifting sands which often hide all signs of previous travel.

About 25 miles southward from the Stovepipe Spring, Furnace Creek flows from the lower part of a large wash which heads in the Grapevine Range. Here is one of the properties of the Pacific Coast Borax Company, which years ago constructed small irrigating ditches, sowed hay and planted trees, built houses, and established a plant for the treatment of the salts in the flat near by.

At 225 feet below sea-level are about 100 acres of emerald-like fields, long rows of fig trees, and abundant running water, while behind the frowning cliffs and sharp peaks of the Funeral Range guard the valley from the advance of the treasure-hunter from the east.

The borax plant is now idle, though the valuable beds are still owned by the company, which maintains a resident superintendent or foreman. The white flat which we saw from the mountain is

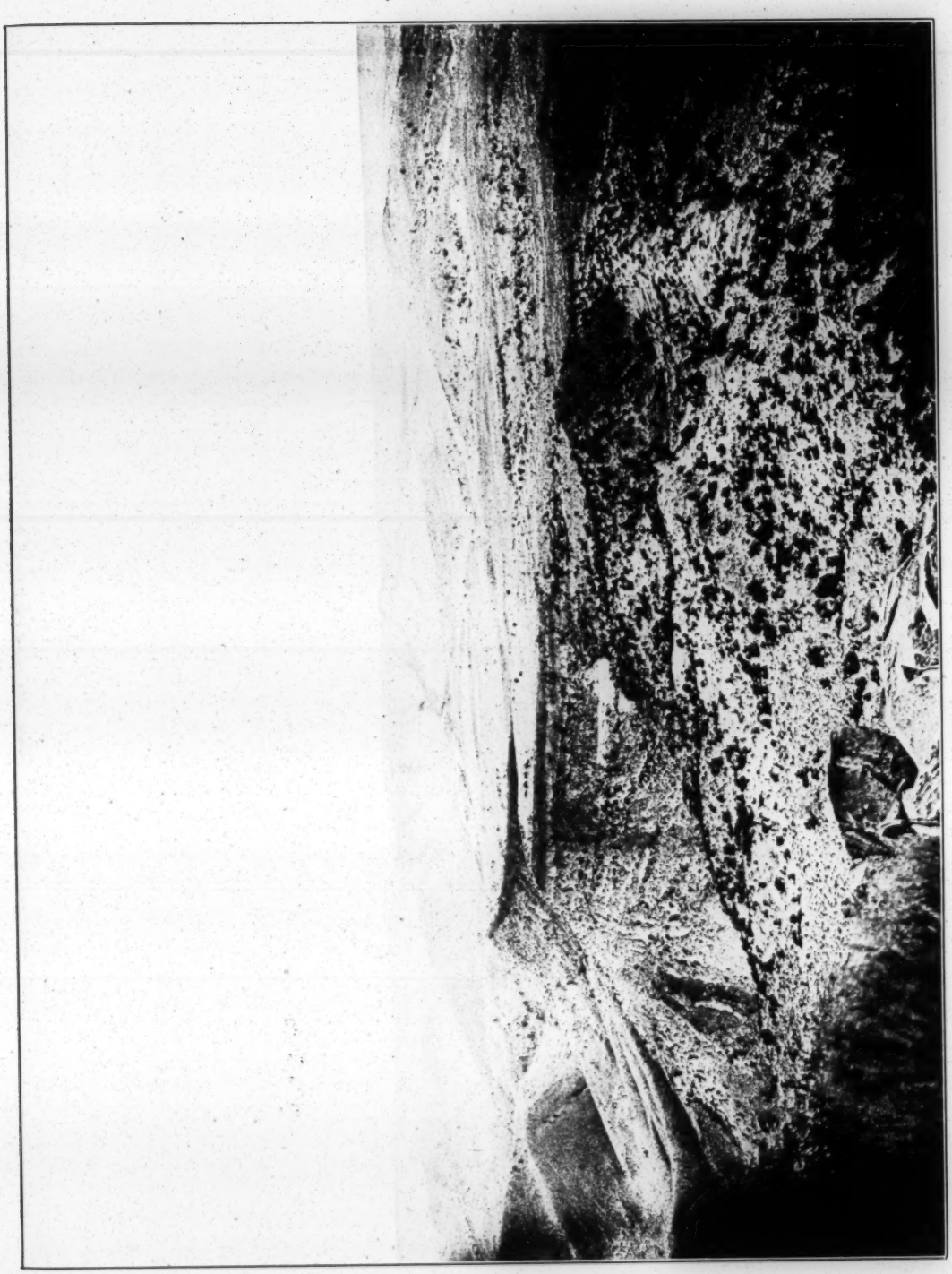

Photo by Robert H. Chapman

Plateau in Great Dry Area, Southern End of Belted Range
View from Oak Spring Butte

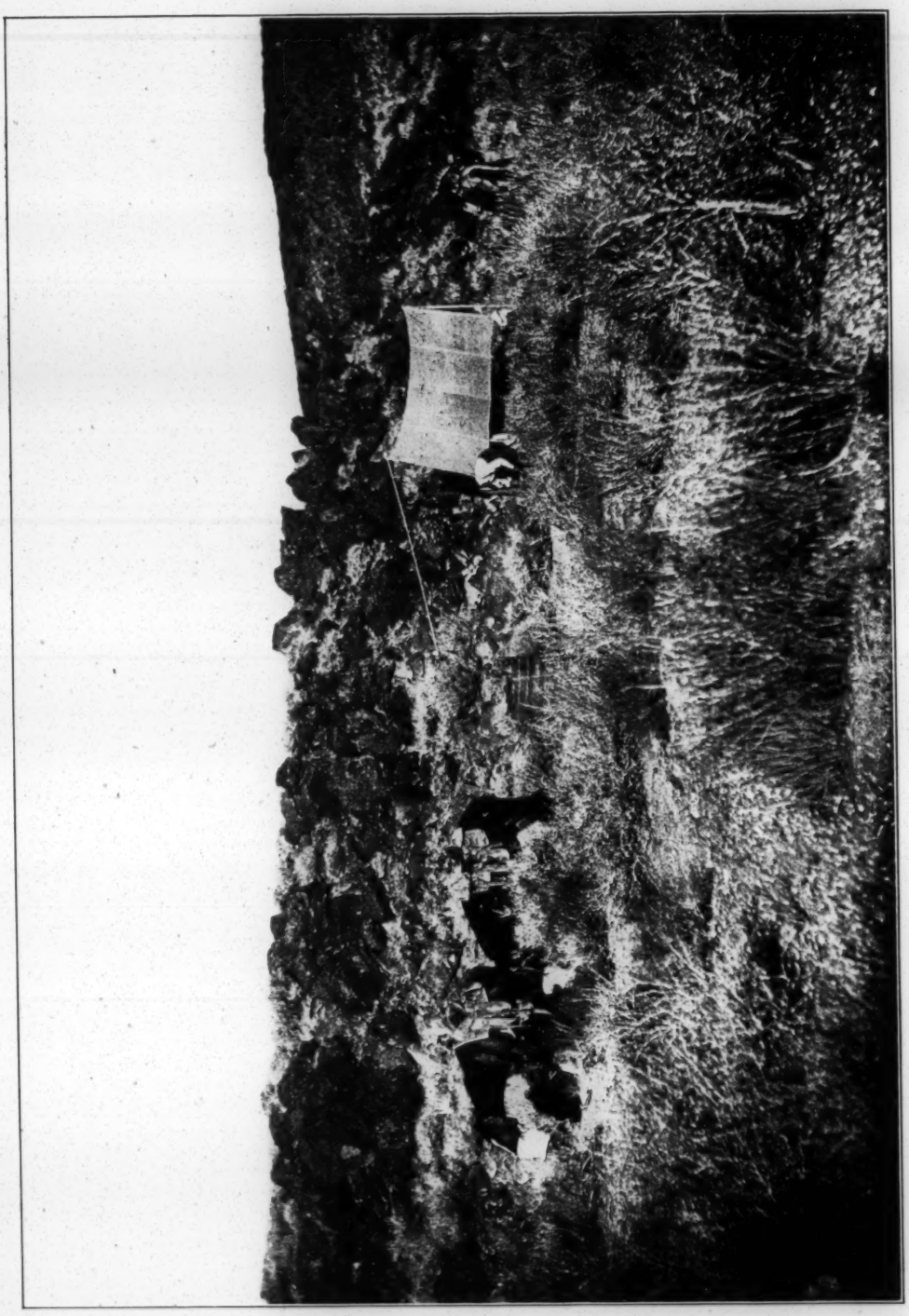

Photo by Robert H. Chapman

Shelter Camp in Great Dry Desert, 27 Miles from Water

composed largely of salt,* borax, and gypsum. The surface is as rough as can be imagined; it consists of ridges, blocks, and plates on edge, inclined, and flat, with shallow drains full of dreadfully salt water. From these drains the mixture of salt and other material is taken, molded into forms, and set up at various places to mark the corners of the mineral claims. This material dries out, and, when the molds are removed, stands like solid marble blocks, which remind one of the fate of Lot's wife. Here we are informed that during the summer the temperature reaches more than 130 degrees in the shade, and that the nights are too hot for sleeping, but during our visit in November the weather was beautiful except during the fierce sandstorms.

Much of the real development in Death Valley has been done by the parties interested in borax, which is found here and in many parts of the desert region. The "cotton-ball" (borate of soda) is found in the flats, but "colemanite" (borate of lime) is found in the hills and mountains, high above the flats of the valley bottoms. At one time it was attempted to refine borax at Furnace Creek, but no work of gathering or treating is now done there. The freight teams of the company bring provisions every few months. From here the now-famous 20-mule team hauled to Mojave; such teams are often seen along the lines of communication in the desert, but few have so many animals or such heavy wagons.

There is one way to become famous in Death Valley—that is, to die near to a trail so that one's remains may be found. For instance, meeting a man one day, I inquired about the route, water, etc. He said: "The road is plain for ten miles, when you'll find a well about 100 yards to the right; the water is salt, but your mules will drink it. Six miles farther you'll come to 'Tim Ryan, Aug. 9th, '05,' and two and one-half miles southeast of him you'll find plenty of good water."

From the valley where, even now in November, the temperature is between 80 and 90 during the day, we cross to the Panamint Range. At the mouth of Cottonwood Canyon we halt for lunch, having covered eight miles during the morning, and find numerous hieroglyphics on the walls. These illustrate Indians fighting over water, and depict a running stream, the bighorn sheep, and various animals and birds.

Twelve miles up this wash we find cottonwood trees, some grass, a running stream, and quantities of watercress, which the mules attack with evident relish. Here we find numerous prospectors, learn of an abandoned camp to the north, and water and trails everywhere.

In the Grapevine and Panamint ranges there are still a few mountain sheep. Tracks near water-holes and a few old skulls are the nearest we come to a view of these shy animals.

To the northward we follow along the range, often in sight of our valley camp miles away, and 48 hours after leaving the summit of the valley we are camping 9,000 feet above it, wading in snow varying from ankle to waist deep, with shoes and stockings frozen hard, the thermometer near 0°, and a cruel wind—a most trying change for man and beast.

In the Panamint Range both sedimentary and volcanic rocks appear, and near one of the contacts of these we travel up a wonderful canyon. The walls are so near to one another that on horseback one may touch both at once. The material is limestone that has been baked into marble of alternate beds of black and white, about a foot in thickness. This trail is one of the old Indian routes to the Valley from Keeler and the Sierra Nevada.

From the summits of the Panamint

*Chloride sodium	94.54
Chloride potassium	0.31
Sulphate sodium	3.53
Sulphate calcium	0.79
Moisture	0.14
Gypsum and clay	0.50
	99.81

U. S. Geol. Survey Bull. 200, p. 18.

Photo by Robert H. Chapman

In the Death Valley

Surveyor's well (65 feet below sealevel), dunes, and mesquite roots

Range we look into the Panamint Valley. Similar to Death Valley in form, but a little higher in elevation, the floor is 6,000 feet below the mountain tops and about 1,000 feet above sea.

Death Valley is by no means the driest of the regions traversed, but the heat and heretofore the inaccessibility have made it difficult. In the mountains flanking it are numerous springs and frequent water-holes which, though dry in summer through excessive evaporation, are available during the fall and winter. There are many springs that are credited as poison water; one of these we sampled, but unfortunately the bottles were broken before analysis could be made. In my opinion, there are springs in which arsenic is present, but most cases of sickness or death are probably due to drinking excessive quantities at one time, followed by physical exertion in the heat. Such springs as the Indians will not use are better left alone or used in extreme moderation, by no means an easy thing for one throat-parched and speechless for need of water. Each spring is a source of supply for flocks of birds, many of which are very tame.

The desert region is being rapidly invaded by the various transportation companies, replacing the primitive methods. The Tonopah and Tidewater Railroad is building from Ludlow, on the Santa Fe Railroad, through the Amargosa Desert, to the mines at Bullfrog, with connections to the borax mines en route. The railway from Las Vegas, on the San Pedro Railroad, to Bullfrog is under construction. These roads plan to run through to Tonopah, which will make prospecting much easier and less expensive, give a stimulus to the production and shipment of ores, and make profitable properties that would be practically valueless without them; they will lessen to a great extent the difficulties of travel. With these and other changes the desert will repay many fold those who seek its treasures of gold, silver, and lesser metals and materials.

The traveler in the deserts should be sound in heart, kidneys, and liver; have calm judgment; obtain all information possible of watering places before undertaking a journey; never leave camp without some food and water; discount from 30 per cent to 50 per cent the physical efficiency of himself and his animals, as experienced in other, cooler, fields, and abstain from alcoholic drinks, especially when doing physical labor. Many cases of collapse and death are due to alcohol or overestimation of strength.

Great mountains are a joy to the lover of nature; they are an inspiration to the artist, and express grandeur and nobility. The desert has no such spirit, but has a wonderful fascination, born of the impressiveness of magnificent distance, limitless sky, and the infinite patience of an unbreakable calm.

JAPAN, AMERICA, AND THE ORIENT*

By Hon. Eki Hioki

Chargé d'Affaires of Japan, 1905–1906

NOW that the Japanese-Russian war is ended, the world seems to be vigilantly watching the next act which will be produced on the stage of Oriental politics. Speculations of various kinds are advanced by all sorts of people. Some anticipate that the next play that Japan will put on the stage will be a peaceful comedy. Some predict that it will be the repetition of another tragedy, while others apprehend both. No doubt the power that Japan developed during the last war with Russia must have surprised the world, but that surprise of the world has surprised Japan more.

Some preach the doctrine of the yellow peril, some question the ambition of Japan, others apprehend Japan's designs upon the Philippines. Such questions as these: Will Japan adopt the Monroe Doctrine for Asia? Will she control China? Will she not beat the Americans in industrial and commercial competition? Will she not monopolize the markets of China and crowd out American goods? Will not Buddhism come into rivalry with Christianity? Will not the 700,000 Japanese soldiers, now in Manchuria, when disbanded, flood the western coast of the United States with Japanese immigration? are constantly asked on all sides.

Taken altogether, it would appear that the world is trying to ascribe to the little island empire the position of a dictatorship in the Orient. I wish such was the real position of Japan, but I must confess, to my regret, that it is too far from fact. Seeing, however, that such questions as these are receiving the more or less serious attention of the thinking class of people in this and other countries, it may not be without value to express at this opportunity my humble views on them.

(1) THE YELLOW PERIL

In spite of the influence which once it gained, the doctrine of the yellow peril seems to have practically lost hold on men's minds, at least in America. Regarding this question, therefore, I have simply to express my deep appreciation of the high intelligence and the fair spirit of the American people.

(2) JAPAN HAS NO DESIGNS ON THE PHILIPPINES

Frank and unreserved disavowals of the alleged designs of Japan upon the Philippines having frequently emanated from authoritative sources, it is superfluous for me to repeat them. But the fact that there is a constant recurrence of the same allegation in the newspapers of this country shows that the repeated disavowals from authoritative sources have born little fruit, either because the general public still distrusts Japan in this matter or because a certain section of the American people want to get up some agitation for their own interest. If a *bona fide* statement of the responsible party failed to convince them, let us try a brief argument. Laying aside entirely for the moment, for the sake of argument, the consideration of the motive of Japan regarding the present subject, let me ask you a question: Can you believe that this great American people who glory in their national spirit, in their gigantic strength, in their boundless wealth, in their marvelous development, and who look forward with proud and confident anticipation to the time when they shall be the first in the race civilization has set for man to run, would allow their flag to be lowered, be it in the Philippines or in any other place which legitimately belongs to them, by any hands

*An address delivered to the National Geographic Society, January 19, 1906.

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but theirs? No; most emphatically no! That is the spirit with which you cling to your new possessions in the Pacific and that ought to be the spirit of the people who cherish honor and justice. And who can better understand that spirit of the Americans than the Japanese?

Therefore, if Japan harbored such a sinister design as is attributed to her, she must be prepared to plunge into a war far more gigantic than the one just ended, against a nation to which she owes much of what she is today and to whose people she owes that moral and financial support so unreservedly given at the most critical period in her history. No! The Philippines are not worth the sacrifice of such a valuable friendship as that of America and the enormous losses in men and money which such a war would necessarily entail. Nor is Japan in a position to carry on another costly war, except for self-defense.

Besides, the situation in the East is far more complicated than people appear to think. During the last quarter of a century the world's great events have all taken place in the East. The destiny of that portion of the world rests now practically in the hands of Japan, Great Britain, the United States, Russia, Germany, and France; and China, with her large population and territory, has not yet gained a position in the council of powers so vitally affecting her interests. When you closely scan the delicate and complicated relations of the interests of the various powers in the East, you will understand how highly Japan must regard good relations between Japan and America for her interests as well as for those of peace in the East.

(3) THE OPEN-DOOR POLICY IN CHINA

The increased prestige of Japan turned the eyes of the world toward the problem of what influence Japan will wield over China. Some people go so far as to assert that Japan will control China, proclaim the Monroe Doctrine for Asia, and drive out from the East all the White Devils and exterminate the western influences within its borders.

Without questioning either the value of the principles contained in the so-called Monroe Doctrine or its applicability to the eastern situation at present, I can simply say that such an idea has not entered into Japanese minds and such a policy has not seen even the symptoms of formation. On the contrary, the policy which has been persistently folowed by Japan in the past was to put her interests in closer and more harmonious touch with those of the western nations. For the maintenance of the integrity and independence of China, Japan joined hands with Great Britain. For securing equal opportunities in China for the commerce and industry of all nations, Japan lent her eager efforts to the United States to make the open-door policy effectively operative—the policy which was propounded by one of the foremost statesmen, diplomats, and scholars of our own day and a citizen of Cleveland, the Honorable John Hay.

While yet the war was going on a fresh treaty of alliance, much broader in its scope than the pact which it replaced, was concluded between Japan and Great Britain. One of the main objects of this alliance is "the preservation of the common interests of all powers in China by insuring the independence and integrity of the Chinese Empire and the principle of equal opportunity for the commerce and industry of all nations in China."

What proof can be stronger, what argument can be more eloquent, than this solemn document in convincing the world that Japan has no motive to close the doors of the East to the nations of the other hemisphere?

(4) JAPANESE INFLUENCE IN CHINA WILL PROVE BENEFICIAL TO THE WHOLE WORLD

It is a matter of congratulation for Japan as well as for all other nations

that there is a fair prospect of the increase of Japanese influence in China as a result of her increased prestige.

China is a vast country of twenty-six times the size of Japan in area.* Its population, which is eight times that of Japan, is described by some writers as being conspicuously marked by the absence of patriotism and cohesion and by its extreme conservatism. The government is strongly decentralized, only a feeble and limited power being actually wielded by the central authorities.

China has long remained insensible to foreign influences. She has had a number of severe trials during her long intercourse with the western nations, but all the earlier complications appear to have had the effect of making her more repugnant to western intimacy. The process of the awakening of China has indeed been long and tedious. The result of the Japan-China war of 1894 sharply stung her pride, but the effect was only temporary, and she was fast falling back to her old, sweet slumber. But the capture of Kiaochow by Germany as the price of the massacre of two missionaries; the seizure of Port Arthur and Talien-Wan by Russia; the lease of Wei-hai-wai and extension of the Kowlung concession by Great Britain; the acquisition of Kwang-Chow Bay by France, and other great events which followed in succession soon after the Japan-China war were a little too much even for the peaceful and patient Chinamen. "The worm turns," indeed. These severe stings finally aroused the patriotism of the people to such intensity that it soon degenerated into a general anti-foreign movement. The consequence was the event of 1900—known as the "Boxer Trouble"—by which China added the most unique chapter to the history of the world. The foreign legations in Peking were besieged and attacked by the regular troops of China, all the communications with the outside world were entirely cut off during nearly three months, while the interior of the Empire was swept by the same anti-foreign tidal wave.

The Powers sent expeditionary forces to Peking for the relief of their representatives and people. After a series of severe fighting, the foreign troops took possession of China's capital. The imperial family fled in confusion to Shansi, a town far out in the interior of China and beyond the reach of the foreign troops. The allied foreign forces made a triumphal march through the imperial palaces, and the city of Peking, together with the territory along the lines of communications to the sea, was placed under foreign military government. Palaces were occupied by foreign troops, looted and destroyed and the lives and property of the Chinese were placed in the most hazardous position. A joint conference of the Powers was held and the famous Peking Protocol was signed on September 7, 1901—the terms having been literally dictated. An enormous indemnity was imposed upon China and within a distance of a rifle shot from the Imperial palace, the real abode of the Great Son of Aeoru and reigning sovereign of China, a strong fortification called "Legation Quarter" was thrown up for the residence of foreign ministers and people and was strictly guarded by foreign troops.

This was a very severe lesson for China. For the first time in her history, China was made to really feel foreign influences. Reform decrees were issued one after the other. Students began to be sent abroad in search of western knowledge. China was awakening.

Just at this juncture, another dazzling event transpired in the territory of China, right under the nose of the Pekinese—that is, the Japan-Russian war. The Chinese watched this gigantic struggle with the keenest interest. The superiority of the western

*Area of—

	Sq. miles.
Japan	162,000
China	4,218,000
United States	3,507,640

method was proved to them beyond all doubt. China is now almost awake.

A large number of Chinese students are now in Japan in search of western knowledge, as it is considered by them to be the quickest and cheapest means to attain the end. Japanese institutions are copied, Japanese books translated, Japanese instructors engaged by the Chinese. In short, Japanese influence seems to be spreading quite rapidly. It is not right, however, to call it Japanese influence, because it is in reality western influence.

The present stage of China's transformation will soon pass over. The next stage will be the sending of an increased number of missions and students to America and Europe, construction of railways, improvement of water communications, introduction of machines, spread of Christianity, and the increase of the productive and buying powers of China. When 400,000,000 people begin to produce and consume the articles of foreign commerce as much as the Japanese people do today, the volume of the world's trade will be immensely augmented. Japanese influence in China is after all a westernizing influence which cannot fail ultimately to benefit the whole world.

When some years ago the Chinese customs service was organized mainly with a staff of Englishmen, the rest of the nations felt exceedingly jealous; but who ventures today to deny that it benefited the whole world? Japan cannot and will not go back to her old ways. China will not learn from Japan anything but western methods. Therefore, if Japan is now in a position better fitted to exercise civilizing influence over China, she ought to receive full support of other nations instead of their jealous suspicion.

Fears are entertained by some people that the Chinese may use the western method against the westerners. I am inclined to think that such a fear is entirely unfounded, because it is certain that the more the western influence spreads among the Chinese, the more intimate will they become to the westerners. Even should such a thing happen, nothing need be feared, for the improved means of communications of our days enable us to make ample provision for the common defense of common interests, as was done in the case of the Boxer trouble.

(5) INDUSTRIAL AND COMMERCIAL DEVELOPMENT OF JAPAN

The last war with Russia has increased the national debt of Japan to the amount of 960 million dollars—the interest of which alone requires nearly 50 million dollars annually. It is indeed a heavy, an enormous burden. And every dollar of it, interest and principal, must be paid. Japan will and must devote her full energy to her commercial and industrial development, and with the capability she has shown in the past no inconsiderable achievement can justly be expected of her new efforts. During the ten years that followed our war with China, the wealth of the nation increased more than ten times and we are now perfectly confident that we will fully recuperate from the effect of the present financial drain in due course of time. It is absurd, however, to say, as some ventured to do, that in the course of a few years American goods will be crowded out of the Chinese market by Japanese competition.

You know quite well how long it took for the United States, with all the advantages she had in inexhaustible natural resources and in better facilities for introducing foreign capital into the country, to recover from the effect of the Civil War. Japan has got to labor under an enormous disadvantage compared with the United States of that time, and it is feared that a long period will have to pass before we can put the new commercial and industrial development on a sound and vigorous condition. The apprehension enter-

tained by some section of the American people as to the commercial and industrial rivalry of Japan is more imaginary than real.

The main ground upon which rests their apprehension is the fact that Japan has cheap labor at command. That this condition should obtain an undue importance in the eyes of the people of America, where altogether peculiar labor conditions prevail, is quite natural. But before jumping to such a sweeping conclusion as that Japan will beat America in the commercial and industrial competition because she has cheap labor, it would be proper to consider the other factors which are equally, if not more, essential to the building up of a nation's commerce and industry.

Of course, everybody knows that the essential factors of industry are labor, capital, and material. Labor is only one of the three, and in our days of machinery its importance has become comparatively insignificant. The history of your own industrial progress has proved this fact. There was a time when the same cry was raised in this country as to European competition on account of their cheap labor, but where stand your industries now? Japan has labor, but the advantages which this country has in the remaining factors of industry are incomparably greater. In addition you have an immense advantage over other nations in your wonderful inventive genius. In the modern system of industry, no human labor, however cheap, can compete with machinery. Besides, labor in Japan does not remain cheap. The effect of the China-Japan war was to double the price of labor. The war with Russia must have raised it very much higher. In spite of all these disadvantages, Japan must develop her commerce and industry and she will have to compete with all the world, friend or foe. It is an absolute necessity for her very existence. But, with an unflinching determination to push her commerce and industry to the forefront, Japan will not resort to "ways that are dark and tricks that are vain." Her commercial war will be fought just as fairly and stoutly as the real war. In China, Japan seeks no unfair advantage. She seeks no favor from China that is not granted to the United States, England, or to the entire world. She stands for the open door, and, in the words of your great President, a "square deal."

Under these conditions, Japan is willing to enter either into an alliance or rivalry of trade with any nation. Japan welcomes capital and material from any country. The United States is supplying materials for our important industries. Why cannot she supply the capital, too? There exists between Japan and Great Britain a political alliance in the East; why can there not be a commercial alliance between Japan and the United States? We are willing to divide a fair share of profits, wherever gained, with any people. The field for the commercial and industrial activity of Japan has been immensely enlarged as a result of the last war, and this offers a specially favorable opportunity for American coöperation. With the cheap labor and a comparatively superior knowledge of Oriental matters possessed by the Japanese, combined with the inexhaustible supply of American capital and materials, we can build up an impregnable commercial stronghold in the East which can defy the rivalry of the world.

(6) JAPANESE IMMIGRATION TO THE UNITED STATES

It has been often asserted in newspapers that when the war with Russia is over and the army of 700,000 men now in Manchuria is disbanded, the Pacific coast will be flooded with Japanese immigration. Such a statement cannot be regarded as an expression of serious opinion, because, unless that enormous army of Japan had at once descended from the sky just for the purpose of the war, there can be no

reason why its disbandment should cause any increase of immigration to the United States or anywhere else.

Japan has no hired soldiers. Every Japanese, without distinction of class or rank, profession or trade, rich or poor, is equally under the obligation to serve three years with the colors and several years in the reserves and national guard. Therefore the Japanese army is not like that of some other countries, composed of men who were taken from among those who had no employment. On the contrary, all and every one of the men who compose that formidable Manchurian army had been taken from actual work at home, so that the effect of the sudden withdrawal of hands from the field of industry is actually being felt in the productive power of the nation.

Such being the case, even if the entire number which left Japan for the campaign returned home intact they would simply have to go back to their own work and not a single hand would remain idle. Taking into account the enormous losses suffered by our army in killed, wounded, maimed for life, and also those who would find new opportunities in Korea and Manchuria, there is every reason to believe that Japanese immigration to the United States will considerably decrease.

(7) THE FUTURE OF THE ORIENT

The Orient, with more than half of the population and more than one-third of the land area of the entire world, and with commerce amounting only to three billions of dollars annually, which is only a little over one-seventh of the total trade of the world, offers an almost unlimited field for future development. The foreign commerce of Japan, which amounted to 58 million dollars in 1880, reached 300 million dollars in 1903. The foreign commerce of China, which amounted to 217 million dollars in 1880, amounted to 355 million dollars in 1903. The growth of China's commerce was slow. She has, as I said before, 26 times the area of Japan and 8 times the population, and yet her foreign trade is only about equal to that of Japan. Should the commerce of China grow to the present rate of that of the West, that is $27 per capita, it would reach the colossal figure of $10,800,000,000, or about one-half of the world's commerce of today. What possibilities lie there in China?

The United States, which has the longest coast line on the Pacific, has entered into the oriental arena of commercial and industrial competition comparatively recently, but the prize she has already gained is remarkable. The imports of China, Japan, and Australia from all the European countries combined increased by 45 million dollars during the period of 1890-1903. During the same period, the importations from the United States alone increased by 49 million dollars, which is actually greater than those of all Europe combined. That is, the rate of increase of the European importations during that period was only about 22 per cent, while that of the United States was 160 per cent. This is truly remarkable. But the prospect for future American trade is still greater. The wonderful facilities afforded by the improved cross-continental communications, the added forces of the mercantile marine on the Pacific, the direct and independent cable connection with the Orient, the possession of the Philippines—all combine to give a tremendous impetus to the expansion of American trade in the East.

Our trade relations with the United States have been prosperous and satisfactory. In 1898 we sold to the United States 23 million dollars' worth and took from her about 20 million dollars' worth. In 1902 we sold to you 40 million dollars and took from you 24 million dollars' worth. The balance of trade has always been against the United States, but it is rapidly gaining the normal condition. In 1881, the imports from the United States formed

less than 6 per cent of the total importations into Japan, while in 1902 they formed nearly 18 per cent of the total importations. In fact, Japan's imports from the United States have grown more rapidly than her exports to the United States; and proportionately they have grown with much greater rapidity than the total importations of Japan.

The showing of American commerce during the first six months of this year is still more remarkable. The imports into Japan increased during this period by 56.9 per cent, of which 22.4 per cent belongs to this country. This extraordinary increase of importations was due to the war which is ended now, but the benefit which the trade of this country has derived and is still to derive from this cause is incalculable. The war has proved at least that this country has greater advantages over other nations in supplying the nations of the East with flour, meat, and manufactures of iron and steel and various other articles. It rests with the merchants of this country to retain this favorable condition of trade and still further improve it. That there should be this turn of the tide is only right, because the United States has been, is, and will be the best customer of Japan. No really lasting and prosperous trade can be expected unless the conditions make it equally profitable to both sides.

I repeat again that the future of the Orient is great, and the greater it is the better for the world. With peace guaranteed by the Anglo-Japanese alliance and equal opportunities in Korea and China secured by that treaty as well as by the coincidental agreement of the policies of the three great Pacific powers—Japan, the United States, and Great Britain — an important era dawned on the Orient. Let us seriously study the opportunities which the changed condition offers and harmoniously work out the way by which we can, by combining the strongest traits of each other, coöperate in developing the yet unexploited treasures of the East. During the last quarter of a century, all the great events of the world transpired in the East. For years to come, the East will still be the center of the world's great events.

THE FORESTS OF CANADA*

By Sir Wilfrid Laurier

Premier of the Dominion of Canada

IN the name of the Canadian Forestry Association, which has conceived and planned this conference, and in the name of the Canadian Parliament, which has authorized and approved it, it is my privilege and my pleasure to extend to you all a most hearty greeting. Welcome to one, welcome to all. Especially should I welcome, even after the words of His Excellency the Governor General, the representatives of the American Republic who are present with us on this occasion, and who bring to us the benefit of their knowledge and experience. Welcome also to the representatives of the provincial governments, without whose aid and coöperation our efforts could never have the full fruition which we anticipate from them. Welcome also to the representatives of the great railway companies, which are placed in a position to give, perhaps more than any other class of the community, the benefit of their experience and knowledge to us. Welcome also

*The opening address to the members of the Canadian Forestry Congress which was recently held in Ottawa.

to the representatives of the great lumbering class, who perhaps are more interested than any other class of the community in the maintenance, preservation, and protection of the forests. Welcome to the university men whom we see before us, welcome to the traders, welcome to the sportsmen; welcome to all classes who are present and who are ready to contribute of their time and of their money to the great object we have in view and which is an object of primary national importance. The large attendance which I see before me, I am most gratified to say, exceeds all the expectations that we had; and this attendance, large as it is, is a manifest evidence that the Canadian people at last realize the great importance of all problems connected with forestry.

THE PRIMEVAL FOREST

A great deal of harm has already been done—harm which, I am afraid, in many respects cannot be recalled; but it is not yet too late, and the harm which we know has taken place is and ought to be an incentive to us to do our best in the endeavor to check it and to give more attention to forestry problems. Our ancestors, when they came to this continent, found it an unbroken forest from the shores of the Atlantic Ocean to the Mississippi Valley. It was the home of a race of hunters who derived their existence chiefly from the chase and for whom, therefore, the forest was a natural element. It was the object of our ancestors to turn this land into a fit habitat for a race of agriculturists, for the white man, whose civilization is based primarily upon agriculture. They had to clear their homes from the forest; but instead of attacking the forest with care and tenderness they looked upon it as an enemy, to be got rid of with the axe, with fire, and with every mode of destruction. History tells us and our own experience tells us that they went at it most mercilessly. The forest had no friends whatever, because, to clear off a few acres of land, they would set fire to miles upon miles of the noblest trees that ever lifted their lofty heads toward the heavens. This, at one time or other, went on in every part of the continent, and even at this very day it is still going on in some parts of the continent.

These pioneers of former days, as the pioneers of these modern days, did not realize that in the economy of nature forests are just as indispensable to the civilization of man as tilled fields. They did not appreciate that, even from the point of view of agriculture, unless tilled fields are furnished by forests with moisture and rainfall, they decrease in their productiveness accordingly, and that the efforts of the agriculturist will suffer in proportion. We have assembled here in order to devise ways and means, if possible, first of all to check this evil and to make every class in the community realize the great importance of maintaining, preserving, and protecting our forests.

THE NECESSITY OF A LARGE FOREST PRESERVE

What I would like to call the attention of this convention to, in the first place, would be the necessity of establishing a preserve, a large forest domain. There are certain portions of the earth's surface which, in the wise economy of nature, must always be maintained as forests. All the hills, mountains, and plateaus which are the sources of flowing streams or rivers should never be allowed for any consideration whatever to remain anything else than forest. No consideration whatever should allow these portions of the earth's surface to be denuded of their trees. We know the consequences, and therefore it is needless for me to dwell upon that feature; it is a mere truism.

If these portions of the earth's surface in our own country are to be maintained as forests it is essential, in my humble judgment at all events, that they should form part of the national domain, that they should belong to the state. In Canada by the state I mean the provincial governments where the manage-

ment of the public lands is left to the provincial governments and the national government where the ownership of public lands is left to the national government. If it so happens, and I am afraid it has happened, that some portions of these watersheds have been alienated from the public domain and have been transferred to private ownership, it should be the policy of the national government and it should be the policy of the provincial governments to repurchase these lands and bring them back to the public domain.

THE EXPERIENCE OF NEW YORK STATE

The state of New York has inaugurated such a policy. The state of New York years ago made the mistake—I was going to say committed the folly, and perhaps that word would not be too strong—of alienating part of the watershed of the Adirondack Mountains. We know the fatal consequences that have arisen from that policy in the droughts which have, more than once, been the bane of that beautiful state. And now, I understand, the legislature of the state of New York has passed laws authorizing the administration, as fast as possible, to re-acquire these lands and make them a part of the public domain. If in any part of Canada a similar mistake has been made, a policy such as that adopted by the state of New York should be adopted here, and the national or provincial government whose business it is should make it their object to bring back to the public ownership the lands that have been alienated and make these forests a part of the national domain, as is done in Germany, France, and some other countries. (Applause.) On this point, I am sure, we all agree.

REPRODUCING THE FOREST

The next consideration for which I would invite the deliberation of this convention is the reproduction of the forests. Our system of treating the forests is to lease them to the lumbermen for the purpose of taking off the merchantable timber. I do not know whether this policy is advisable or not. I believe that on the whole it is advisable. But no effort is made to replace the timber that is taken away from what we call the limit under that policy.

In Germany and France, I understand, it is the accepted policy, a policy that has been followed for generations, when a tree is removed in any way, to replace it by the planting of another tree. (Applause.) I am not prepared to say that such drastic conditions should be imposed upon the lumbermen, though I am not prepared to say, on the other hand, that a plan of this kind should not be taken under advice. At all events, I submit to this convention that we ought to do something more than we are doing at the present time. (Hear, hear!) It is not fair to the country—it is not fair to us who are living, and still less is it fair to the generations to come after us—that we should allow the destruction of the forest to go on year by year, by the cutting down of the trees and make no effort whatever to replace what is thus taken away. The trees are a crop like any other growth. True, they are a crop of slow growth; but that is the only difference between trees and any other crop. In this, as in every case, when a crop is taken off, steps should be taken to replace it at once with another. I said a moment ago that I was not prepared to say that when the lumberman in the course of his work takes away, say, 300,000 trees in a year he should at once plant 300,000 trees; but I do ask this convention to consider what should be done in that matter. One thing might be asked, whether of the lumbermen or of the state, that where trees are taken away, trees should be seeded, so that we may have a crop coming on all the time.

THE BEAUTIFUL PINE FORESTS ARE RAPIDLY DISAPPEARING

It is a fact which we face with some degree of sadness, even to mourning, that Canada in a few years will be devoid, absolutely devoid, of the beautiful pine

forests which at one time were its pride. We can calculate the number of years, and the number is not very great, when there will not be another tree of the original forest to be cut upon the limits of the Canadian lumbermen. But trees have grown and trees ought to grow again. There is an impression, which I have heard expressed on more than one occasion, that it is useless to look for another crop of pine trees; that when you have removed the crop we found here, the growth of many years, the new crop of trees will be spreading and of no merchantable value. But I am told that there is a way whereby a new crop of trees can be grown. The growth should be started as soon as the original trees have been removed from the soil.

A few years ago I was discussing this subject with a lumberman of great authority, a man known to some of you, the late John Bertram, a man most eminent in his profession and of the highest capabilities in many directions. He told me that on his limits on Georgian Bay he had a young crop of pine which he had started a few years before. The explanation he gave me was this—and I am glad to give here the information he imparted to me, so as to gain the opinions of those who have experience in these matters—he told me that when the crop of pine was cut off, the new crop to spring up would consist largely of poplar, and the poplars grew faster than the pine or hardwood trees. And he said: If you take care to plant pine seeds underneath these poplars, the young pines will grow up, shaded by the faster-growing trees. The pines, in their efforts to reach the sunlight, will grow tall and without limbs. After a time, when they overtop the poplars, their life is assured. If this be the case, it seems to me we have here a method of reproducing our trees and of having for all time a constant supply. (Applause.) It is a natural thought that we shall not live to see this young generation of trees at their full growth; but we must not think alone for ourselves, we must think of the prosperity of Canada in the days when all of us shall be sleeping in our graves. This is the sentiment, I am sure, that actuates this entire assembly. (Loud applause.)

THE ENEMIES OF THE FOREST

The next thing I would like the convention to consider is the protection of the forest against its many enemies; for the forest, unfortunately, has many enemies. Man is bad enough, we all agree; but man is not so bad as the insects, and the insects are not so bad as fire. The fire is the great enemy of the forest. Nothing can be sadder for us to consider than that during the summer months there are miles and miles of forest destroyed by fire. This goes on every year. Speaking of my own experience, it has been going on ever since I can remember. It goes on, perhaps, not to so great an extent as in former years, but there is far too much of it yet.

I was talking a few years ago with one of the lumbermen of the city of Ottawa, and he made the statement to me that the enormous quantity of lumber taken to market out of the Ottawa Valley does not represent more than 10 per cent of the timber that has been destroyed by fire. If this is a true statement, the fact is simply appalling. Last week I met one of the lumber kings of the Ottawa Valley, who asked me, "What are you going to do at this Forestry Convention?" I said, "We are going to compel the lumbermen to protect the forest against fire." He replied, "Why, the lumbermen are doing more in that direction now than all the rest of the community put together." I said, "I quite believe it. But that is not saying very much for the lumbermen (applause and laughter), because the rest of the community does absolutely nothing to protect the forest, and the lumbermen may well be doing more without doing enough." (Applause.)

What measures ought to be taken to protect the forests against the raging fires that every year consume such an appalling quantity of the best timber of the country? I know that some effort has

been made in this direction. I know that the lumbermen keep a patrol of the woods of the Ottawa Valley, and that is a great improvement; but I submit that this is not enough. I submit that something more ought to be done, if it be only to have more patrolmen. I believe that we should have the woods patrolled as they are in Germany and France; so that, as far as possible, every incipient fire should be prevented from spreading. Moreover, we should impress every man in Canada—the lumbermen, the sportsmen, the man out of any class—with the belief that it is a crime, an absolute crime, to throw a lighted match upon the ground (applause), to scatter the ashes of a fire, or to leave a camp fire before it is absolutely extinguished. (Loud applause.) All these things are crimes, and I would go so far as to say that they should be made crimes under the law.

DESTRUCTION CAUSED BY THE RAILWAY LOCOMOTIVE

There is another mode of destruction to which I want to call the attention of the convention, and it is the destruction of the railway locomotive. The railway locomotive is a great blessing undoubtedly, and I am not here to say anything harsh of it; but if you take the train at Halifax to go to Vancouver, in every province of the Dominion where there is timber—in Nova Scotia, in New Brunswick, in Quebec, in Ontario, in British Columbia—you will see miles and miles and miles of what was once beautiful forest and which is now nothing but parched and blackened timber, a monument to the destructive power of the railway locomotive. I know that the railway men have done a great deal to obviate this evil. They have used all possible ways of overcoming the difficulty inherent to the operation of the railway locomotive. They have put screens upon their stacks, they have devised different methods, but all these methods have been inadequate and I do not know that in that direction they can do more than they have done; but perhaps the railways ought to be compelled in the summer season, at all events, to have extra patrolmen on their tracks so as to prevent incipient fires, to follow sparks in their progress, and to extinguish them before they have caused any damage. I think that is one question that ought to be carefully considered by this convention, and I believe that if it were to do nothing more than to prevent fires by railway locomotives, this convention would have done a great deal; but I think it will do more than that.

GOOD EXAMPLE OF MANITOBA AND SASKATCHEWAN

There is another subject to which I would also invite the attention of the convention. That is tree planting. It is not sufficient that we should preserve our forests where we have forests. It is not sufficient that we should plant forests also to a great extent, but we should invite people generally to give more attention to tree planting at their homes and especially upon their farms.

The Canadian government some eight years ago introduced into one of its departments a forestry branch. It has done a great deal of good in that respect, and I hope that Mr Stewart, who is the administrator of this branch, will give us some information as to the work which he has done. It has done a great deal already, to my certain knowledge and to the knowledge of every one who has been in the Northwest.

It was my privilege last September to visit the Province of Manitoba and the new provinces of Saskatchewan and Alberta. Fourteen years had elapsed since I had seen them before, and of all things which struck me in this wonderful country the thing which perhaps gladdened my heart more than anything else is the attention which is given to forestry. Fourteen years ago, when I first visited the Province of Manitoba and the territories of Alberta and Saskatchewan, the farms were absolutely barren of trees; you could not see a tree around them. Now I am glad to say that around most of the farms of Manitoba and many in

Saskatchewan and Alberta you can see groves of trees. The city of Winnipeg in that respect is an example to the cities of the east. The city of Winnipeg has done marvels in the way of tree planting. The streets of Winnipeg today are a credit to that city and would be a credit to even an older city than it is. But there is a great deal to be done in the east, and in that respect perhaps my own Province of Quebec is the greatest sinner.

My own countryman, the French Canadian, is the man with the axe. There is no better man in that respect than he. He goes into the forest, and there is no man who can equal him in forest work; but in the meantime he has not been as careful as he should have been in preserving the trees in his midst. I should like to impress upon every Canadian farmer the necessity of covering with trees every rocky hill and the bank of every running stream. It is very easily done. He has only to scatter the seeds on the ground, fence it, and nature will do the rest.

These are some of the questions which I hope will be taken into consideration by yourselves. I do not intend to limit the number of questions which shall be taken into consideration, but these are some to which, with others, I invite the serious attention of this convention.

THE VAST TIMBER BELTS OF CANADA

A RECENT report on the forests of Canada by U. S. Consul Henry S. Culver, at London, Ontario, gives the following summary of their great dimensions:

There are three great timber belts in the Dominion: The northern or spruce belt, the southern or commercial belt—both east of the Rocky Mountains—and the British Columbia belt, west of the Rocky Mountains. These belts do not include, however, the forests of the maritime provinces, which are extensive and valuable, covering about one-tenth of the area of Ontario and Quebec, or the forests of New Brunswick and Nova Scotia, which may be compared in a general way to those of Maine.

FORESTS OF BRITISH COLUMBIA

The western or British Columbia belt is far superior to either of the eastern areas, for the reason that the climate, tempered as it is by the warm waters of the Pacific Ocean, promotes a more perfect growth and development of the different species. Here is found not only the valuable red fir or Oregon pine, generally distributed throughout the entire province along the coast and on the mountains, but also the red cedar, the western spruce, the yellow cedar, the hemlock, the balsam fir, the western white pine, the western yellow pine, the maple, and the western oak in such quantities as to make this the most valuable timber belt on the North American continent. This belt extends from the forty-ninth parallel north to the sixtieth parallel, a distance of some 770 miles, and is from 200 to 300 miles wide. The best timber does not extend to the extreme north. That portion is covered with black and white spruce, and constitutes a very extensive pulp-wood range.

But this region, because of its great distance from the markets in the East and the lack of cheap transportation, will remain comparatively in its primeval state until the eastern forests are nearly exhausted or until better transport facilities are afforded.

THE NORTHERN FORESTS

The northern belt is perhaps greater in extent than all the other timber belts and reserves of Canada combined. According to the best authority, it extends from the eastern coast of Labrador north of the fiftieth parallel in a northwesterly

direction to Alaska, a distance of some 3,000 miles, with an average width of perhaps 500 miles. This vast strip of timber land, if placed upon the territory of the United States, would extend from Maine to California and from the southern shore of Lake Erie to the northern boundary line of Georgia. It is known as the spruce forest of the Dominion, the great bulk of the timber being of that species, black and white, the other important trees being larch and poplar.

Although this belt has been but partially explored, it is claimed that many of the trees in the southern portion are of a lumber-producing size, but the greater portion is fit only for pulp.

When it is considered that spruce is distributed in vast quantities through all the forests of Canada, and that an almost incalculable amount will be produced in this great northern belt, it is hardly exaggeration to say that the Dominion possesses an inexhaustible supply of pulp wood.

Dr Robert Bell, Director of the Geological Survey of Canada, says of the area of the forests:

"The area of our northern forests may be reckoned as forty-four times as great as that of England. Any one of these forty-four parts will produce wood enough to supply the ordinary demands of the present population of Canada—that is, 5,000,000 people could get what is required for mining, fuel, etc., by taking the timber from a space the size of England—and would be able to allow the other forty-three equal parts to be in reserve or used for export."

The railway being built from Sault Ste. Marie to Hudson Bay will make available the timber growing around the bay and along the line of the road, and may possibly provide a more accessible field of pulp wood than can be obtained in any other way for the rapidly growing industries of the Soo.

THE SOUTHERN BELT

The southern or commercial timber belt spreads over a very wide territory. It comprises that portion of Ontario and Quebec lying between the forty-fifth and fiftieth parallels of latitude and bounded on the east by the St Lawrence River and on the west by the Great Lakes and Manitoba. Great interest centers in this great timber region by reason of its proximity to the manufacturing centers of the United States and because it contains the most valuable timber for lumber east of the Rocky Mountains.

It is not, however, a compact and unbroken belt of first-class timber. Climatic conditions seriously interfere with the development and growth of some of the best species of timber that inhabit this region, for none of the best ones extend farther north than the watershed between Hudson Bay and the Great Lakes, approximately the fiftieth parallel of latitude, and many of them find their northern limit far south of this parallel. The composition and extent of this timber belt can be better understood by taking a map of the Dominion and tracing its boundaries and noting the northern limit of the most valuable species. The forty-fifth parallel cuts out entirely one very valuable species—the black walnut—whose northern limit of growth is the latitude of the city of Toronto, while a few miles north of this parallel is the northern limit of red cedar and white oak. A line drawn from the city of Quebec to Sault Ste. Marie will designate the northern limit of beech, while a line drawn from the northern part of New Brunswick to the north shore of Lake Superior will mark the northern boundary of sugar and hard maple. Two other species which have their northern limit within this belt are elm and birch.

The king of the northern forests is white pine, which has its northern limit, as have also white cedar and red pine, at this fiftieth parallel of latitude. This region is now virtually its only home in the Dominion of Canada. It was at one time supposed that it had a very extensive northern range, but Dr Bell states that its distribution is comparatively southern, very little being found north of the fiftieth parallel.

This belt would furnish an enormous

supply of excellent timber but for the destruction wrought by forest fires.

Dr Bell calculates that about one-third of this territory may be considered as under a second growth up to about 10 years of age, one-third as intermediate, and one-third including trees of 100 years or more, and this applies doubtless to all the forest areas of Canada; to this particular belt, which lies at the very doors of the great manufacturing establishments of the United States, and is the one foreign timber region upon which we rely, the available supply of first-quality timber is alarmingly limited.

The Canadian forests have never been called upon to pay the enormous tribute to multiplying industries that our forests have; but they have been decimated by the speculative lumberman and the improvident settler, and ravaged by fire until those forests which are most accessible bear little resemblance to their primeval state.

But it is not too late for the Canadian people to preserve what is left of their great timber reserves, and by a vigorous and judicious system of reforestation they may be able to meet every demand for their best timber for a long time to come. They are awake to the responsibility, and are taking measures to preserve what is left and to reforest the waste places.

ANIMAL WEALTH OF THE UNITED STATES*

WITH AN EXPLANATION OF SOME OF THE REASONS OF ITS PHENOMENAL DEVELOPMENT

By Hon. Francis E. Warren

Senator from Wyoming

CONGRESS has had much to do and the press of the country and the people much to say of late about live stock and the products and manufactures therefrom.

The newspapers and public men of certain States have aggressively demanded "free raw material"—so called, erroneously—such as free wool, free hides, free coal for manufacturing same, etc.; and the excitement in one State at one time reached a point where a candidate for governor was in wide difference through the public press with the President of the United States as to sentiments entertained and expressed upon this subject.

Still later, from the White House and by Executive direction has followed an inspection of certain features of the live-stock industry, the result of which has surprised the nation.

The Twelfth Census reports, covering a period of collection and compilation of over six years ago, indicated that the live-stock industry, even at that time, was the largest of all the industries in the United States, and a statement of the industry as it exists today would show that it maintains its supremacy and is deserving of the most careful and important consideration by Congress and the American people.

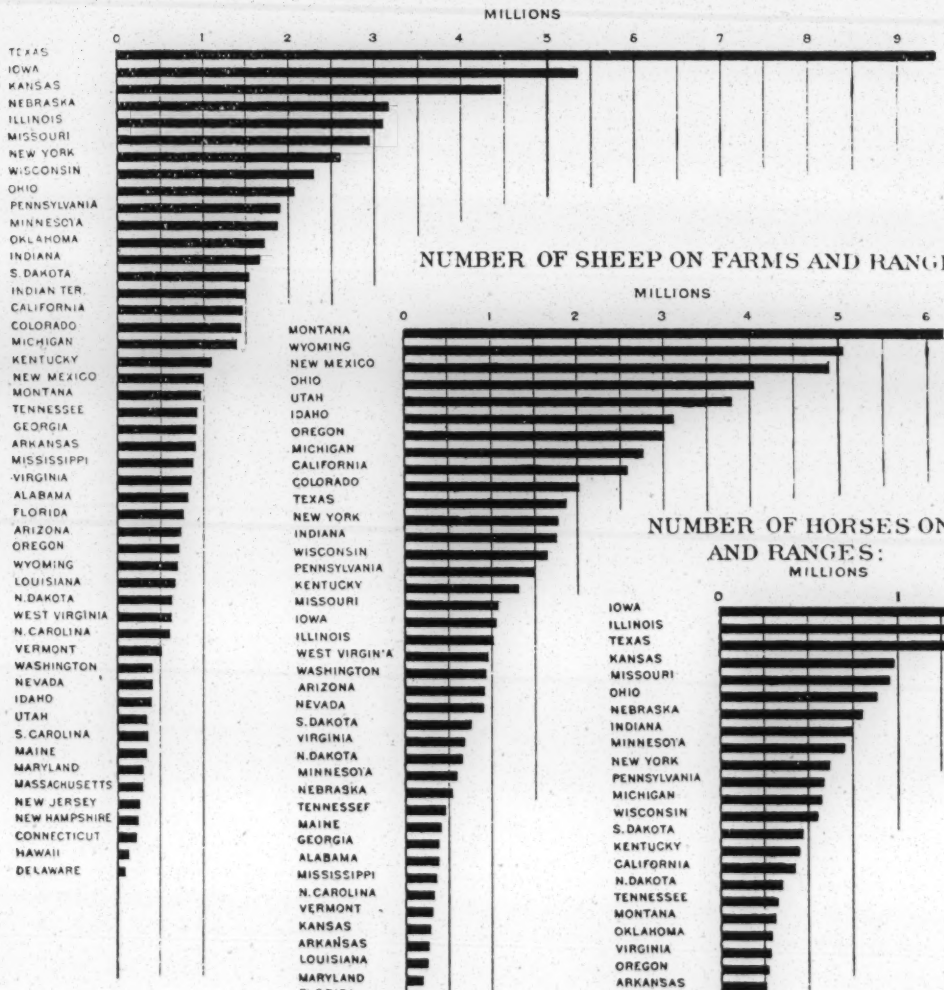
In the United States, in 1899, the Bureau reported:

Domestic animals, value, $2,981,722,945.

	Number.	Value.
Neat cattle	67,822,336	$1,476,499,714
Horses	18,280,007	896,955,343
Mules	3,271,121	196,812,560
Sheep	61,605,811	170,337,002
Swine	62,876,108	232,027,707
Goats	1,871,252	3,266,080

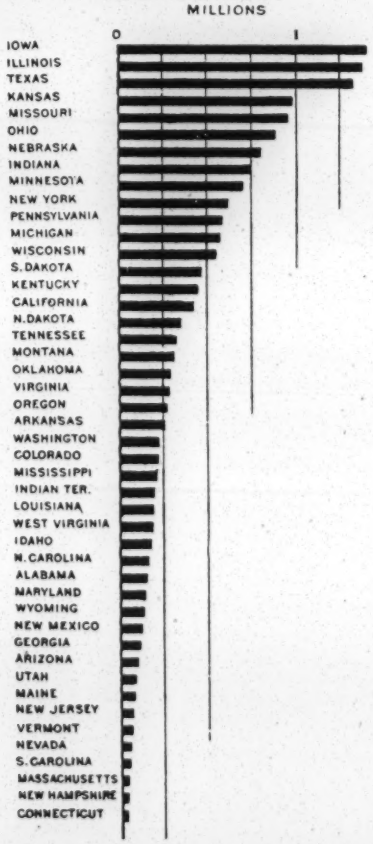
*This article is the substance of a speech delivered in the United States Senate June 27, 1906.

NUMBER OF NEAT CATTLE ON FARMS AND RANGES.



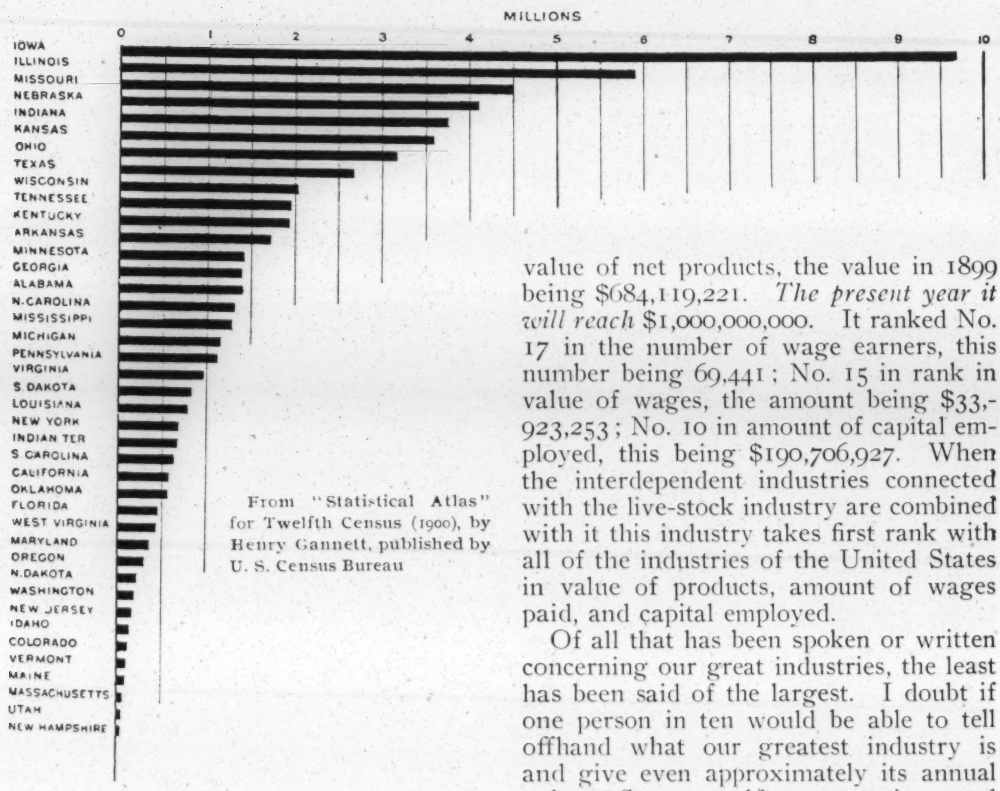
NUMBER OF SHEEP ON FARMS AND RANGES.

NUMBER OF HORSES ON FARMS AND RANGES.



From "Statistical Atlas" for Twelfth Census (1900), by Henry Gannett, published by U. S. Census Bureau

NUMBER OF SWINE ON FARMS AND RANGES.



From "Statistical Atlas" for Twelfth Census (1900), by Henry Gannett, published by U. S. Census Bureau

The number of persons engaged in the live-stock and interdependent industries at that time was:

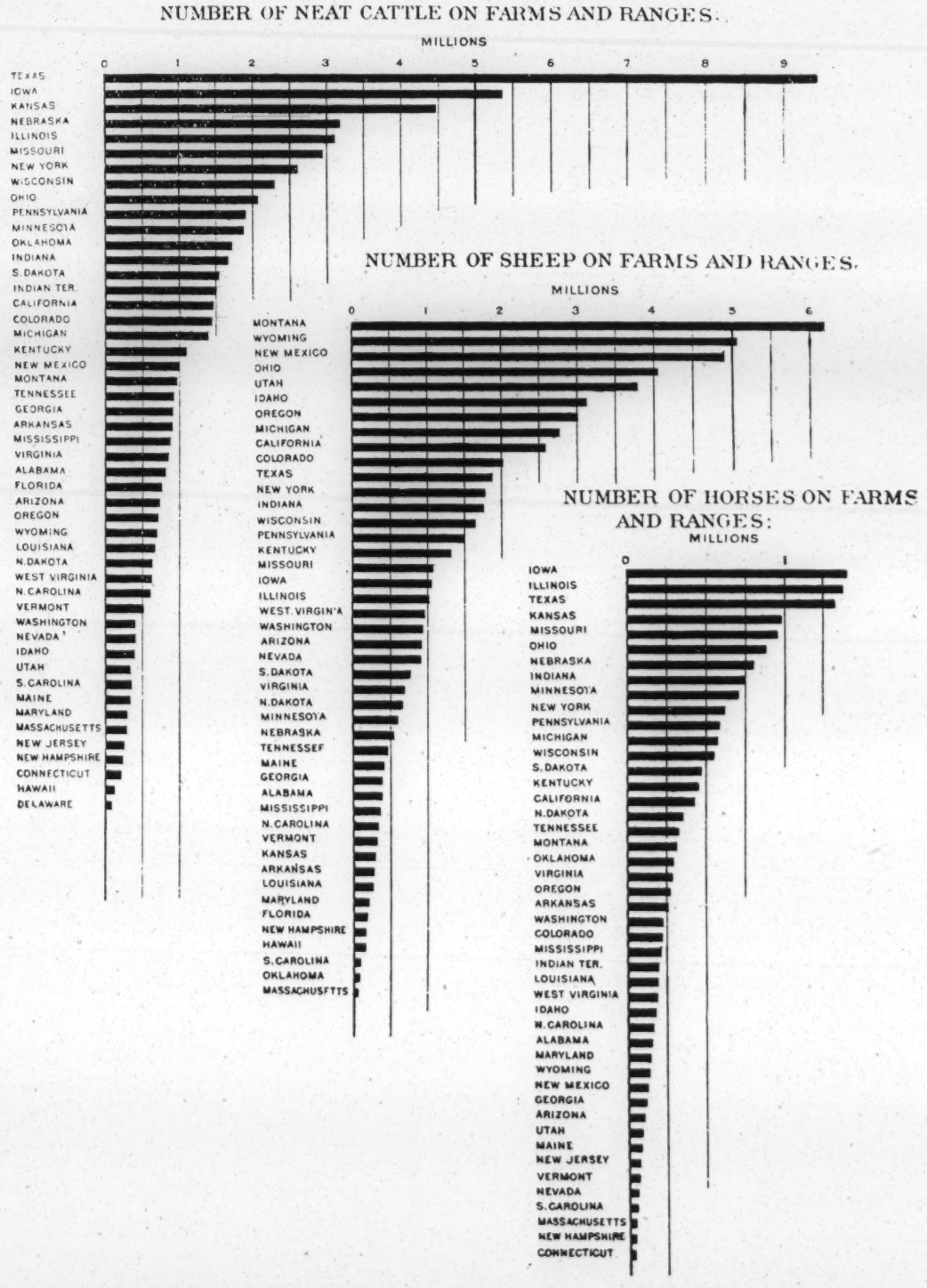
In agricultural pursuits	10,381,765
Stock raisers, herders, etc	169,976
Butchers	113,193
Meat packers	13,776
Leather and its products	557,401
Candle, soap, and tallow makers	4,020

A total of 11,240,131 persons, whose livelihood was dependent directly and indirectly on the live-stock industry, or 38 per cent of our entire working population.

THE GREATEST OF OUR INDUSTRIES

The incidental branch of the live-stock industry, that of slaughtering and meat packing, not including retail butchering, ranks No. 1 in all of our industries in value of net products, the value in 1899 being $684,119,221. *The present year it will reach* $1,000,000,000. It ranked No. 17 in the number of wage earners, this number being 69,441; No. 15 in rank in value of wages, the amount being $33,923,253; No. 10 in amount of capital employed, this being $190,706,927. When the interdependent industries connected with the live-stock industry are combined with it this industry takes first rank with all of the industries of the United States in value of products, amount of wages paid, and capital employed.

Of all that has been spoken or written concerning our great industries, the least has been said of the largest. I doubt if one person in ten would be able to tell offhand what our greatest industry is and give even approximately its annual value. Some would say our iron and steel production, with its more than $1,000,000,000 worth of yearly output. Others would say our textile industry is the largest; and yet our woolen, cotton, silk, and linen goods combined do not equal our iron and steel products. Others would perhaps say our mineral products, which in 1904 amounted in value to $1,289,000,000. Some might think our building industry the greatest. Some would no doubt say our lumber and timber products, and others our flouring and grist mill products. Some might say our freight traffic or total railroad earnings of about $2,000,000,000. But they would all be wrong, for, as I have already indicated, the one branch of industry under consideration is greater than any of the others I have named, and it far exceeds any other single agri-



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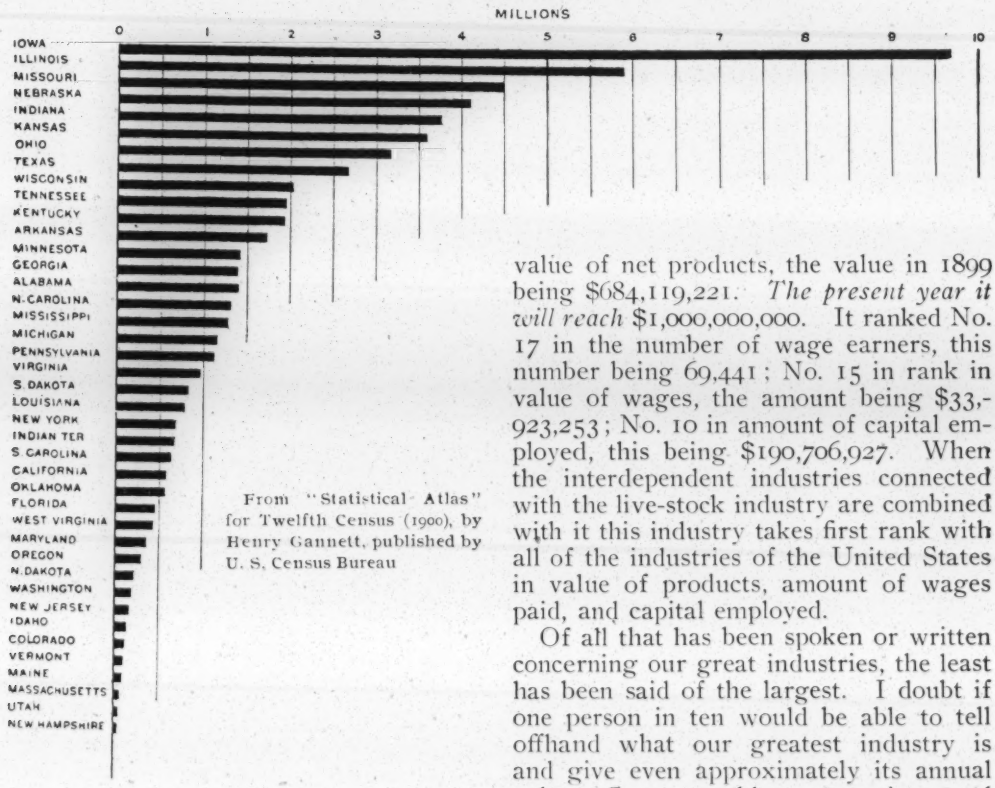

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cultural or manufacturing pursuit in which our people are engaged.

Of course, I refer to the raising, slaughtering, and distribution of animals and animal products. That it may be seen how this compares with other great industries, I present the following table of figures taken from the census of 1900:

Value of Products, Census of 1900.

Carpentering	$316,101,758
Clothing (men's)	159,339,539
Cotton goods	339,200,320
Flouring and grist mill	501,396,304
Foundry and machine shop	644,990,999
Iron and steel	596,689,284
Lumber and timber	555,197,275
Printing and publishing	347,055,050
Woolen and worsted goods	296,990,484
Slaughtering and meat packing (not including retail butchering)	785,562,413

In 1905 the census returns show the value of products of slaughtering and meat packing alone, and not including retail butchering, to have reached the enormous sum of $913,914,624. But in addition there were 113,193 butchers engaged in retail butchering to a greater or less extent, whose products would swell the above figures to at least $1,500,000,000, for it must be remembered that the great packers reship about 40 per cent of their live stock. Then there are about 6,000,000 farmers whose product, if each slaughtered only $100 a year on the average, would amount to $600,000,000. So that it is a very conservative and low estimate to say that the annual product of our animal industry exceeds $2,000,000,000 in value.

This is many times the value of all the gold produced in the world in 1903. It is nearly as much as all the gold produced in the United States during our whole history.

RELATION OF RAW MATERIAL TO FINISHED PRODUCT

Let me at this point call attention to the most significant feature of this industry, namely, the value of the so-called raw material. The cost of material used in the iron and steel production of 1900 was $390,563,117; in the foundry and machine-shop products, $286,357,107; in cotton goods, $176,551,527, and in other great industries the cost of material runs from less than one-half to about three-quarters of the value of the finished product, while in the slaughtering and packing industry the cost of raw material in 1900 was $683,583,577, or about seven-eighths of the value of the final product.

It is chiefly of this material that I shall speak today, and I propose, Mr. President, to confine myself for the most part, in the brief remarks I shall make, to one branch of the great industry, namely, cattle and cattle raising.

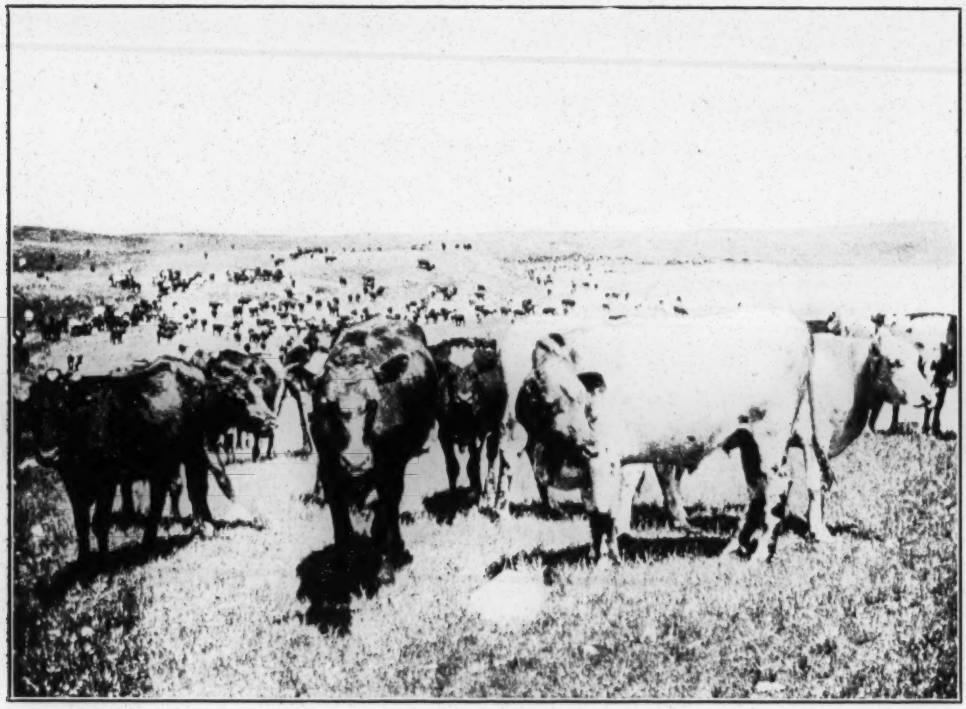
SHEEP AND WOOL

Much attention has been given in the past to our sheep and wool industry. It has been attacked by free-traders and defended by protectionists. We have tried free wool and seen our flocks disastrously shrink in number and value.

Let me make but a single comparison. In 1893 our sheep numbered 47,273,553 and were worth $125,909,264. In 1897, after more than two years of free wool, our sheep numbered only 36,818,643 and were worth only $67,020,942, or but a little more than one-half their value of the four years previous. On January 1 of this year, under protection, in spite of the great demand for lamb and mutton, we had 50,631,619 sheep, and their value was $179,056,144, or nearly three times their worth under a free-wool tariff.

VALUE OF FARM ANIMALS UNDER FREE TRADE AND TARIFF

On January 1 of this year our farm animals were valued at $3,675,389,442, as compared with a valuation of $1,655,414,612 on January 1, 1897, the last year of the Gorman-Wilson tariff. Let me now give the figures for several years showing the number and value of milch cows, oxen, and other cattle. They are taken from the Statistical Abstract, as follows:



Herd of Cattle on the Summer Range

January 1—	Oxen and other cattle.		Milch cows.	
	Number.	Value.	Number.	Value.
1890	36,849,024	$560,625,137	15,952,883	$353,152,133
1891	36 875,648	544,127,908	16,019.591	346,397,900
1892	37.651,239	570.749,155	16,416.351	351,378,132
1893	35.954,196	547,882,204	16,424,087	357,299,785
1894	36,608,108	536.789,747	16,487,400	358,998,661
1895	34.364,216	482,999,129	16,504.629	362,601,729
1896	32,085 409	508,928,416	16,137,586	363,955,545
1897	30,508,408	507,929,421	15,941,727	369,239,993
1898	29,264,197	612,296,634	15,840,886	434.813.826
1899	27,901,225	637,931,135	15,990.11	474,233,925
1900	27,610,054	689,486,260	16,292,36	514,812,106
1901	45.500,213	906,644,003	16,833.657	505,093,077
1902	44,727,797	839,126 073	16,696,802	488,130,424
1903	44,659,206	824.054,902	17,105,227	516,711,914
1904	43,629,498	712.178,134	17,419,817	508,811,489
1905	43,669,443	661.571.308	17.572,464	482,272,203
1906	47,067,656	746,171,709	19,793,866	582,788,592

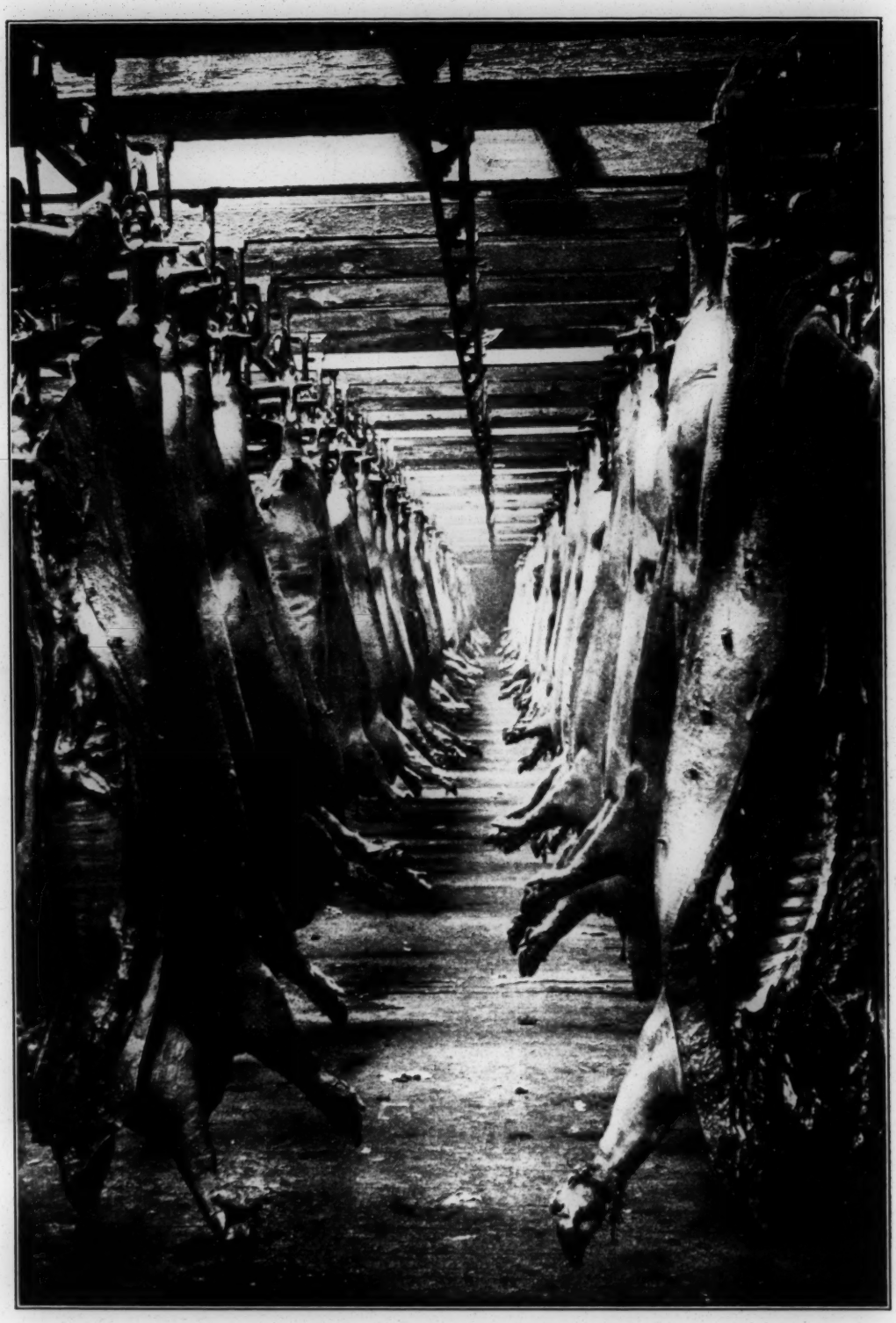
It will be seen that the cattle of January 1, 1897, numbered 46,450,135, while on January 1 last they numbered 66,861,522, a gain of 44 per cent. The value of these cattle was $877,169,414 on January 1, 1897, and $1,328,860,311 on January 1, 1906, a gain of 51 per cent. The average under the Wilson-Gorman tariff was about $860,000,000, while the average value under the Dingley tariff has been $1,237,000,000.

Coming now to the cattle slaughtered, I will give the number received at five western markets during 1895 under the Wilson-Gorman tariff, and 1905 under the Dingley tariff.

Number of Cattle Received at Markets Named

	1895.	1905.
Chicago	2,588,558	3,410,469
Kansas City	1,613,454	2,180,491
Omaha	586,103	1,026,392
St Louis	851,275	1,254,236
St Joseph	49,203	501,200
Total	5,688,593	8,372,788

A gain of 47 per cent.



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A Half Mile of Pork

Scene in a large Chicago packing-house

It is probable that this gain per cent was fully maintained at the many smaller markets throughout the country, and as the gain in value was much greater than the gain in number, the cattle raiser has been doubly benefited under our present tariff law.

The present duty on cattle, Mr. President, is none too large for the protection of our farmers and cattle growers. The plea is made that the duty only benefits the so-called "meat trust," and enables the packers to control the price of meat, which we know is greater than it was ten years ago. I do not propose to either condemn or defend the so-called "meat trust." I simply want to assert that the duty has nothing to do with the retail price of meat, save in so far as our tariff, in giving more employment and more wages to consumers, creates a demand for meat far in excess of previous years and far in excess of the demands of any other people. I have shown that the value of cattle has increased over 50 per cent since the Wilson-Gorman tariff.

Meat in the United States, under protection, is less in price than in Great Britain under free trade. Beef, according to the prices furnished by the New York Produce Exchange, was 20 to 25 per cent higher during 1905 than during 1895. But corn and hay and labor were more than 25 per cent higher. If the packers do control prices, and if they could import cattle from Mexico, Canada, and other countries duty free, then who would benefit? We would have to pay the same price for beef, and the packers would pocket the difference. They would then compel our farmers and cattle growers to meet the foreign price, depressing the domestic industry, reducing cattle prices, and then hold us at their mercy as regards prices for retail consumption.

SOME EXPERIENCES UNDER WILSON-GORMAN ACT

In this connection I want to give you our experience under the Wilson-Gorman tariff. Under the tariff of 1890, known as the "McKinley law," the duty of $10 per head on cattle over a year old was practically prohibitive. With the repeal of that law and the reduction to 20 per cent ad valorem under the tariff of 1894 importations of cattle were resumed. Let me give you a few sentences from the testimony of Representative Noonan, of Texas, before the Ways and Means Committee of the Fifty-fourth Congress, January 5, 1897:

> The present tariff has practically placed horses, cattle, sheep, and goats on the free list, and it has resulted in great loss to the breeders of stock, many of whom have been bankrupted. Numerous ranches have been abandoned or have gone into decay, and millions of acres of good grazing lands are unused and the grass wasted because the business does not justify stockmen in raising animals for market at present rates. As a consequence all of their industries are languishing from the effects of Mexican competition. Nearly half a million of cattle have been imported from Mexico into the United States through Texas ports since the repeal of the McKinley law. The ranchmen of Texas are unable to sell their stock at the price paid for the Mexican cattle. Texas cattle raisers are required to rent or buy land upon which to graze their cattle, and they are obliged to pay more than double the wages paid in Mexico. Hence citizens of Texas are almost a unit against the importation of these Mexican cattle. At least 95 per cent of the cattlemen in Texas are opposed to the present duty and are in favor of the restoration of the McKinley rate. The tariff once restored—a specific tariff and one sufficient to protect their interests—the old abandoned ranches will at once be reoccupied and our people will again be remunerated for their expenditure and labor, and the prosperity they have yearned for will return.

Our farmers and cattle raisers want protection for their product, and we should be wronging every one of our agriculturists and those depending on them by lowering the present duty. The benefit is far reaching, as can be seen by the fact that of the 325,000,000 bushels of corn produced in Nebraska in 1905, half of it was fed to cattle; the same ratio undoubtedly holding good for Iowa, Kansas, Missouri, and other sections.

The tariff on cattle protects and benefits nearly one-half of our people as producers or dependents, and it does not affect the price of meat to the consumer.

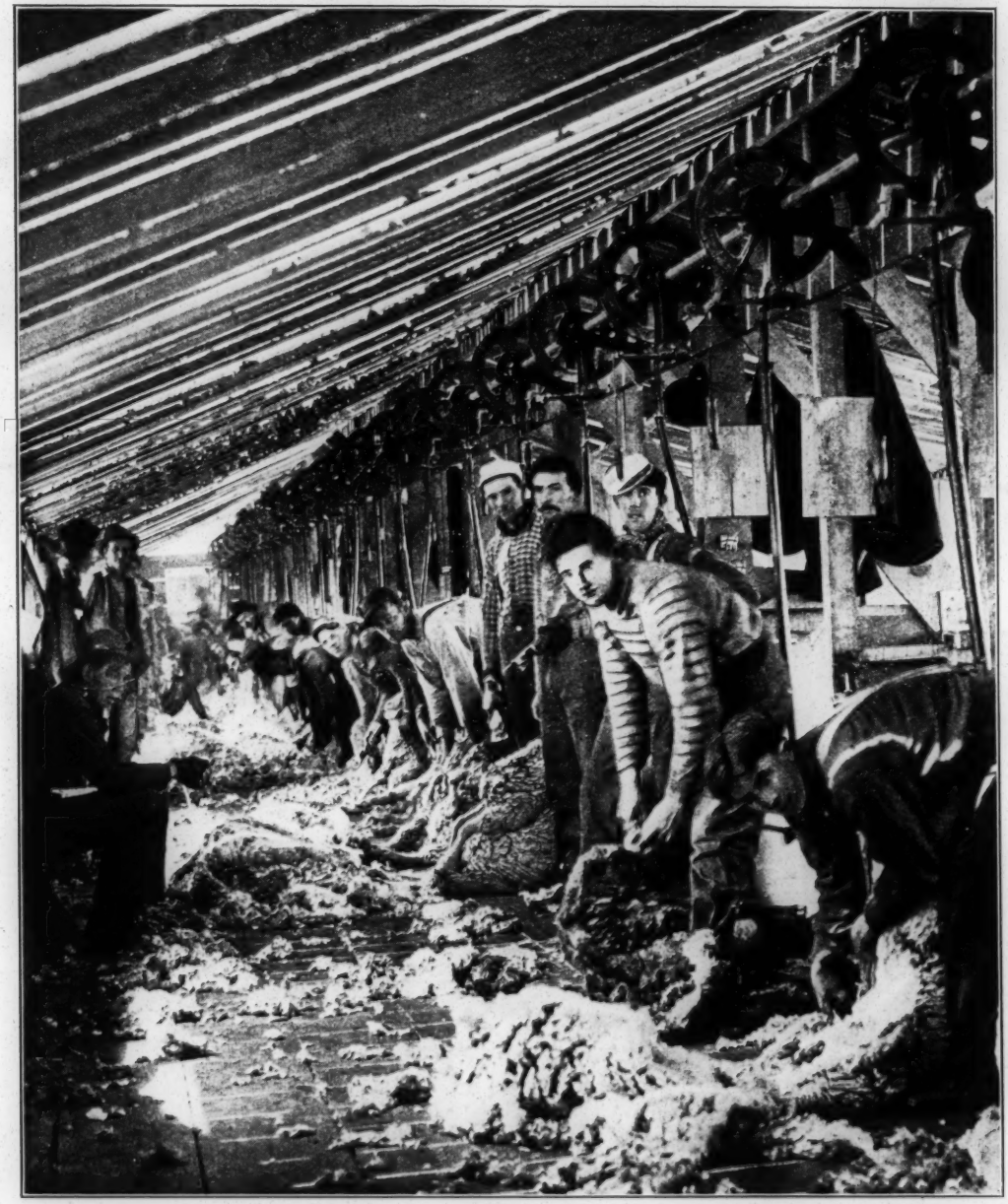
From Stereograph Copyright, Underwood & Underwood, N. Y.

A Thriving Family

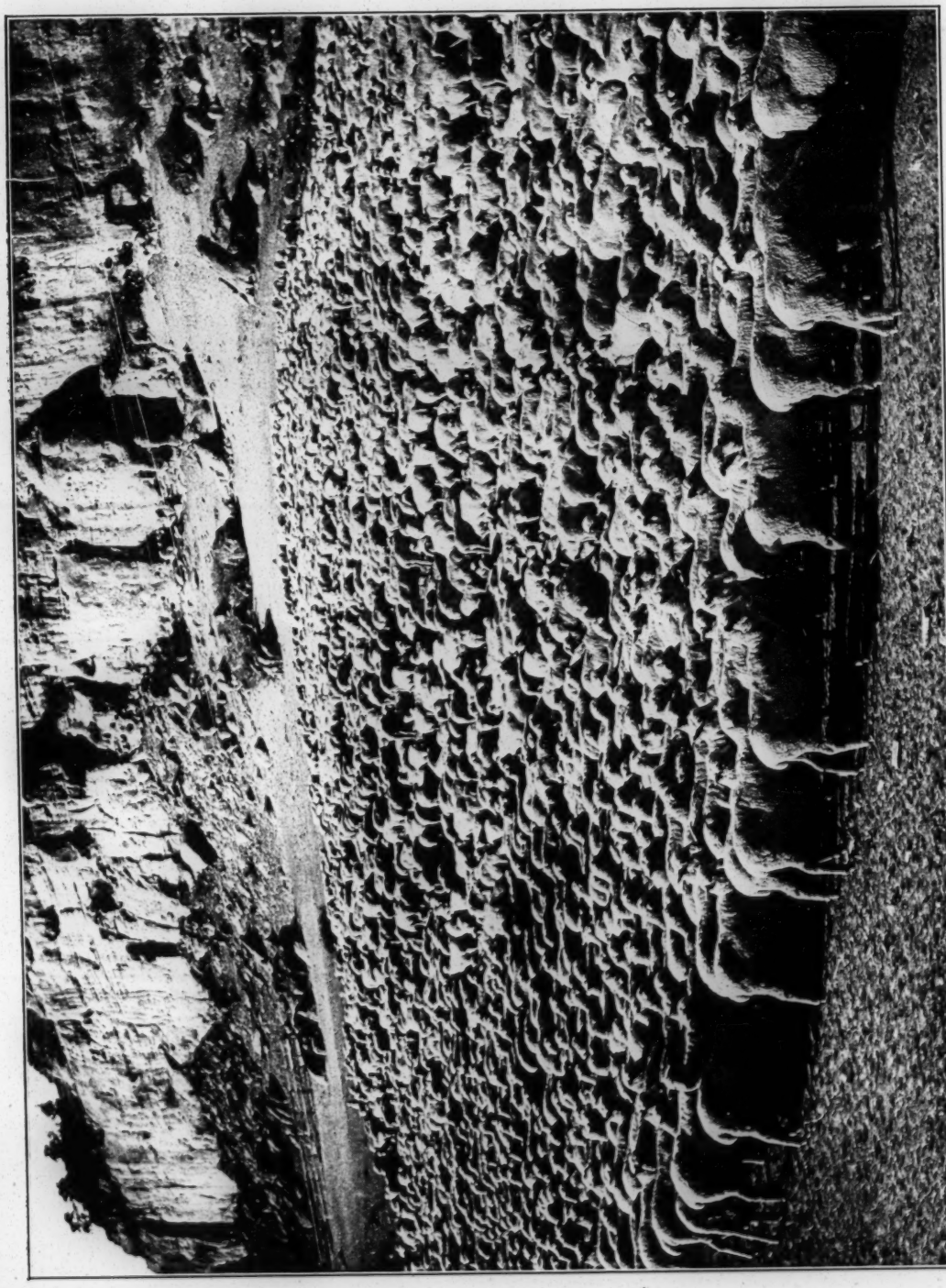
FINISHED PRODUCT OF OTHER INDUSTRIES PROTECTED

Let me now briefly explain why the cattle grower should benefit and why this branch of his industry should be protected. In the first place, the finished products of other great industries, of which his finished product is the raw material, has greater protection, larger duties, than his own. It is estimated that of 1,000 pounds of live stock, 550 pounds become dressed beef, leaving 450 pounds of non-edible material. This latter is converted into so-called "by-products," the science of converting which has made such progress that there is today practically no waste whatever of this 450 pounds of non-edible material, but, instead, 120 different products, all more or less valuable, are secured. So important and interesting is this phase of the subject, that I wish to quote the following from a recent article:

> Once the 450 pounds of non-edible material was largely thrown away, although the hide and tallow were utilized. Later, some of the waste products were used in the manufacture of glue. Nitrogen being the chief element in plant food, and this being abundant in the great mass of refuse matter originally thrown away as hopeless waste from all the packers' processes, a most important economic advance was made in the step which turned this large volume of scrappage into fertilizer.
>
> It is good sense and for the best interest of the world that all material not needed to feed, clothe, and heal the world should be returned to the ground for food for plants, to grow more grain, to feed more cattle, and to feed more people. That is the circle completed by the packer.
>
> All the cunning of the chemist has been



The Modern Method of Sheep Shearing with the Aid of Clipping Machines



Band of Four Thousand Wethers Ready to Ship to Market near Billings, Montana

called into service to save, to make the most of every scrap of material in the land, and to discover new ways in which some elements of waste may be diverted from uselessness to use. Hundreds of valuable products are now made and shipped all over the world from materials which under old methods had little or no value. Thousands of people are employed in manufacturing these products. The technical schools are constantly being called upon for young men to aid in solving new problems in by-product utilization. New plants are being built requiring material, machinery, and labor in construction. Success in by-product utilization in the packing industry has directed the attention of other industries in this important element in industrial administration.

All this directly affects the people and has been of great benefit to them. The investigator in medicinal and other lines is constantly calling upon the packer for material to aid him in his work. In the pharmaceutical line much has been done of benefit, and many ills are helped by pharmaceutical preparations of animal origin. In the fertilizing line many sections are given over to growing products which could not be profitably grown without the use of fertilizers. The upland-cotton section of the South has been made by the use of fertilizer in the growing of cotton. Sandy soils in sections climatically favorable have been developed into large truck-farming districts through the use of fertilizers, as the soil without fertilizers is practically sterile.

The furniture of the country is glued with the packers' glue. A great deal of wool used in clothing is from the sheep slaughtered by the packers. One of the largest sources of curled hair is the switch from the tails of cattle. A large portion of the soap manufactured comes from the tallows and greases prepared by the packers. The colors in the summer prints worn by women are largely fixed by the use of albumen prepared by the packers, as is also the finish on many of the fine leathers. The horn comb, hairpins, and buttons are made from the horns of steers. The knife handle, the bone button, and many other articles are made from hard bone of cattle.

Researches by scientists of the first class are employed every day by physicians, surgeons, dentists, and chemists throughout the world. More than thirty recognized therapeutics agents of animal origin are produced in Armour & Co.'s laboratory. Among them are the pepsin and pancreatin that physicians use in treating digestive disorders. There is a product of the thyroid glands that is employed in treating cretinism or idiocy. Another is suprarenalin, used in the most delicate surgical operations to stop the flow of blood. To illustrate how closely the by-product feature of the business is gleaned, the suprarenal glands of more than 100,000 sheep are required to produce 1 pound of suprarenalin, and when produced this suprarenalin is worth more than $5,000 a pound.

Certain by-products of the packing plants are used for hardening and for coloring steel. In fact, materials of animal origin, the result of by-product utilization, enter into the manufacture of almost every article extensively.

Most of these by-products are protected, and the farmer and cattle grower buy them back and consume them more largely than any other class of people. It is fair and equitable to them that they should have a compensating duty on their own products. I will endeavor to illustrate this fully in the case of the principal by-product of cattle—hides.

Some of the manufacturers of boots and shoes are particularly insistent upon a repeal of the duty on hides. And yet they never were so busy or so prosperous as they have been under the operation of the present tariff. I wish to give the figures showing our exports of cattle, leather, and boots and shoes for the two years 1895 and 1905, the former under free trade, the latter under dutiable hides of cattle.

Exports of Cattle, Boots, Shoes, and Leather

Article.	1895.	1905.
Cattle.....number...	331,722	567,806
Cattle .....value...	$30,603,796	$40,598,048
Boots and shoes...number pairs...	822,412	5,315,699
Boots and shoes.....value...	$1,010,228	$8,057,897
Total leather and manufactures of.....	$15,614,407	$37,936,745

UNITED STATES EXPORT OF BOOTS AND SHOES INCREASED 500 PER CENT.

It will be seen that our exports of cattle increased about 25 per cent; our exports of all leathers and manufactures of about 150 per cent, and our exports of boots and shoes over 500 per cent in number and 700 per cent in value.

Great Britain has had free trade all these years and cheap labor, and yet, though twelve years ago she exported more than twelve times the boots and shoes we did, we have caught and passed her in this, as in about everything else. *We have, under dutiable hides, become*

Sheep Ranch near Billings, Montana. Twelve Thousand Sheep in this Picture

the leading exporters of boots and shoes, in spite of the fact that the average price per pair is $1.52, as against 95 cents for those exported from Great Britain, and about all of this difference goes to the American workman.

A TENFOLD INCREASE

But the great increase in exports of leather, and particularly in boots and shoes, does not compare with the increase in output for domestic consumption. This is shown in the product of the manufactories of Massachusetts, where the increase of value of shoes made was $70,271,966 in 1905, as compared with 1895, when the increase over 1885 was only $7,405,548. *A tenfold increase* does not look as if the Massachusetts shoe markets were being injured by a small duty on a portion of their material.

No wonder that Governor Guild and the Boston papers can boast of the great prosperity of Boston and vicinity. Here is a recent extract from the Boston *Globe*:

> Boston is the center of the wealthiest and best purchasing community in the country without any exception whatever.
>
> In the purchasing ability of the average person Boston is far ahead of all according to the national census.
>
> Per capita wealth of the people of Boston, $1,942; New York, $1,337; Philadelphia, $1,127; Chicago, $1,016; St Louis, $918.
>
> One-twentieth of the wealth of the United States is within 50 miles of Boston.
>
> One-fifth of the savings of the people of the United States is in the Massachusetts savings and coöperative banks to the credit of Massachusetts depositors.

GOVERNOR GUILD ON MASSACHUSETTS PROSPERITY

Governor Guild said in his annual address to the legislature of Massachusetts last January:

> Massachusetts, fourth from the foot in area, is seventh from the top in population, fourth from the top in the annual value of her manufactures, and third from the top in the annual amount paid in wages. Measured by assessed valuation of the property in her borders, Massachusetts is exceeded by but two States. Fourth from the foot in area, Massachusetts is third from the top in wealth
>
> The annual value of the manufactured products of Massachusetts increased by but $175,173,033 between 1885 and 1895. It increased by $300,267,558 between 1895 and 1905. The total value of goods made in Massachusetts was $1,150,074,860 in 1905.
>
> On October 31 the total amount on deposit in our savings banks was, in 1885, $274,998,412; in 1895, $438,269,861, and in 1905, $662,808,312. The increase in the last decade was greater by over $58,000,000 than in the decade that preceded it. In 1885 the average deposit for each person of population was $141.64; in 1895, $175.69, and in 1905, $220.67. The gain in deposits per capita in the last decade was greater by nearly one-third than the gain in the preceding decade.

We do not envy Massachusetts her great prosperity. We all rejoice in it.

With free hides, during the three or four awful years the result of the Wilson-Gorman tariff on general business, cattle hides on the ranges of Western States, such as Wyoming, were not worth the taking off. In killing beef the hides had necessarily to come off, but even then they were thrown aside and never shipped, because the railroad freight charges alone amounted to more than the hides would fetch in market, and so they were thrown aside by the thousands and rotted where thrown; whereas now, in these same States, with railroad charges equally as high, each hide brings several dollars and adds just that much to the worth of every head of cattle.

DUTY ON HIDES A GENERAL BENEFIT

The duty on hides has been of general benefit and of injury to no one. Neither manufacturers, merchants, nor workingmen have been affected adversely by the operation of the duty; on the contrary, all have been benefited through increased employment, increased wages, and increased sales, while the cattle grower has certainly benefited by a larger sale of his product at profitable prices. I do not deny that the duty increased the price of hides somewhat, but the increased value is of slight moment in the cost of each pair of shoes, but is of much concern as to each cattle hide.

But suppose we had free hides and free shoes; what would be the result? We should soon have millions of pairs of cheap shoes dumped on our market. The material being the same, the foreign manufacturer with his low-priced labor—a labor costing one-half or one-third of ours—could close our factories or else compel our laborers to work for starvation wages. The purchasing power of the 200,000 persons now making shoes would be cut in half or disappear altogether, and so much of our home market would be lost to the farmer and other manufacturers. We have had just such experiences, and it is far from guesswork.

CULTIVATION OF MARINE AND FRESH-WATER ANIMALS IN JAPAN*

By K. MITSUKURI, PH. D.

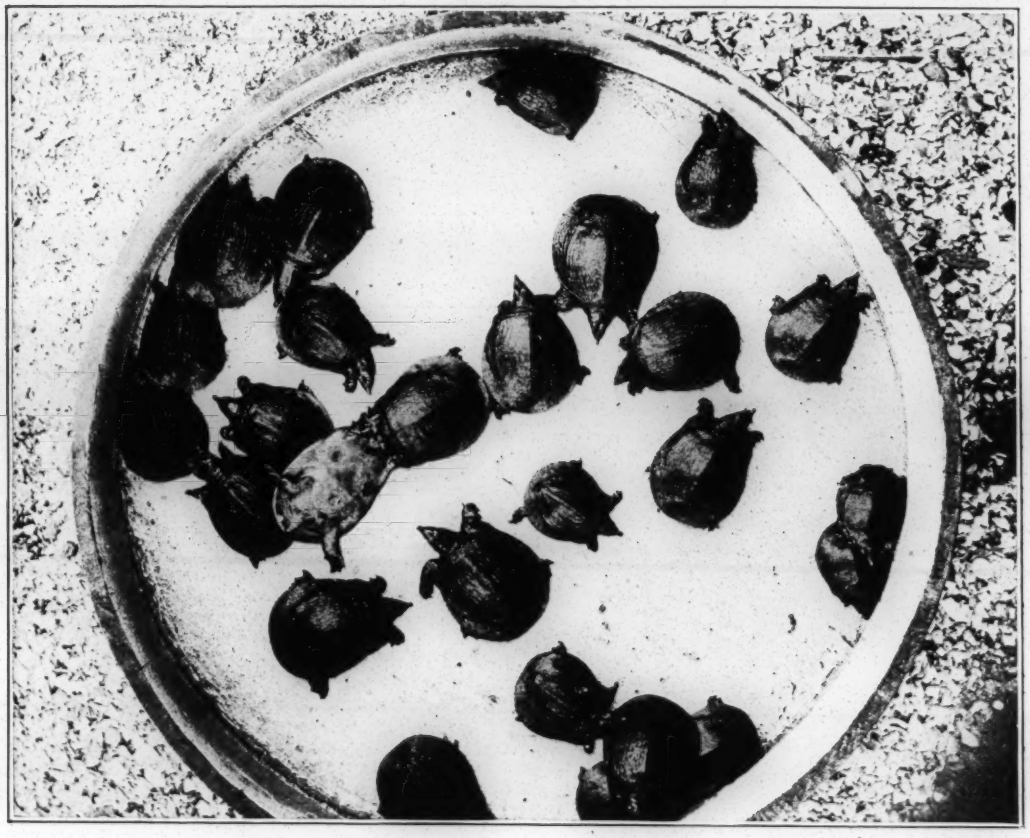
PROFESSOR OF ZOÖLOGY, IMPERIAL UNIVERSITY, TOKYO, JAPAN

WHILE the pasturage of cattle and the cultivation of plants marked very early steps in man's advancement toward civilization, the raising of aquatic animals and plants, on any extensive scale at all events, seems to belong to much later stages of human development. In fact, the cultivation of some marine animals has been rendered possible only by utilizing the most recent discoveries and methods of science. I believe, however, the time is now fast approaching when the increase of population on the earth, and the question of food supply which must arise as a necessary consequence, will compel us to pay most serious attention to the utilization for this purpose of what has been termed the "watery waste."

For man to overfish and then to wait for the bounty of nature to replenish, or, failing that, to seek new fishing grounds, is, it seems to me, an act to be put in the same category with the doings of nomadic peoples wandering from place to place in search of pastures. Hereafter, streams, rivers, lakes, and seas will have, so to speak, to be pushed to a more efficient degree of cultivation and made to yield their utmost for us. It is perhaps superfluous for me to state this before an audience in America, for I think all candid persons will admit that the United States, with her Bureau of Fisheries, is leading other nations in bold scientific attempts in this direction.

Japan, I need hardly remind you, consists of an immense number of islands, large and small. In proportion to its area, which is nearly 160,000 square miles, its coast line is immense, being, roughly speaking, 20,000 miles. This is broken up into bays, estuaries, inlets, and straits of all sorts and shapes, with an unusually rich fauna of marine organisms everywhere. In addition, the country is dotted with lakes and smaller bodies of fresh water. Put these natural conditions together with the facts that the population, in some districts at least, has been extremely dense, and that until within comparatively recent times hardly any animal flesh was taken as food, and even at the present day the principal food of the general mass of people consists of vegetables and fish—it would be strange indeed if the cultivation of some aquatic organisms had not developed under these circumstances. And such is actually the case. For instance, the oyster culture of

* This article is abstracted from a paper read before the International Congress of Arts and Sciences, held at the Louisiana Purchase Exposition, St Louis, Mo., August 21-25, 1904, and published by the U. S. Bureau of Fisheries as a special monograph, 1906.



From U. S. Bureau of Fisheries

Second-year Young of Snapping Turtle (Trionyx). Reduced $\frac{1}{35}$

Hiroshima and the algæ culture of Tokyo Bay are well-known industries which have been carried on for hundreds of years.

TERRAPIN FARMS

The place occupied among gastronomical delicacies by the diamond-back terrapin in America and by the green turtle in England is taken by the "suppon," or the snapping turtle, in Japan. The three are equally esteemed and equally high priced, but the Japanese epicure has this advantage over his brothers of other lands—he has no longer any fear of having the supply of the luscious reptile exhausted. This desirable condition is owing to the successful efforts of a Mr Hattori, who has spared no pains to bring his turtle farms to a high pitch of perfection, and is able to turn out tens of thousands of these reptiles every year. His are, so far as I am aware, the only turtle farms in the world which are highly successful.

In general appearance a turtle farm is at a first glance nothing but a number of rectangular ponds, large and small, the large ones having a size of 15,000 to 20,000 square feet. One or more of the ponds is always reserved for large breeding individuals, or "parents," as they are called.

In Hattori's farm a person goes around the "parents' pond" once a day or so and covers up with wire baskets all the new

Egg Deposits of Snapping Turtle (Trionyx) Covered with Wire Baskets

The eggs are generally spherical in shape, although sometimes more or less oblate. Their diameter is in the neighborhood of 20 millimeters, the largest being as large as 24 millimeters, the others smaller according to the size of the females. The number of eggs in one deposit varies from 17 or 18 up to 28 or more. Each female lays 2 to 4 deposits each season.

deposits made since the last visit. Each basket may be marked with the date if necessary. This covering serves a two-fold purpose—the obvious one of marking the place, and in addition that of keeping other females from digging in the same spot. When hundreds, or even thousands, of these baskets are seen along the bank of a "parents' pond," it is a sight to gladden the heart of an embryologist, to say nothing of that of the proprietor.

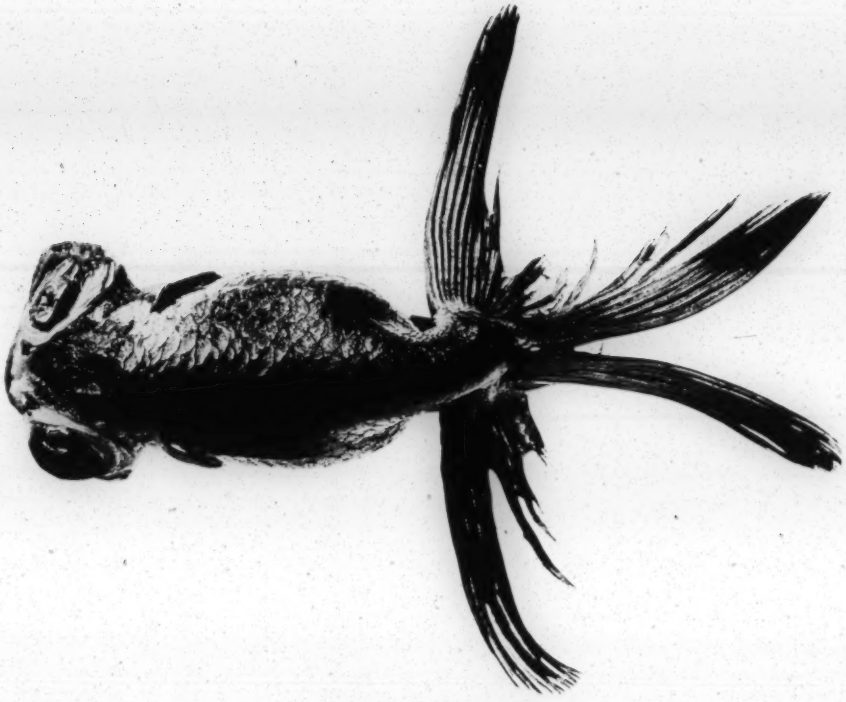
The hatching of the egg takes, on an average, sixty days. The time may be considerably shortened or lengthened, according to whether the summer is hot and the sun pours down its strong rays day after day, or whether there is much rain and the heat not great. It may become less than forty days or more than eighty days.

The young just hatched are put in a pond or ponds by themselves and given finely chopped meat of a fish like the pilchard. This is continued through September. In October the snapping turtle ceases to take food, and finally burrows into the muddy bottom of the pond to hibernate, coming out only in April or May.

From the third to the fifth year, inclusive, the young need not be kept in ponds strictly according to age, but may be more or less mixed, if necessary. The

young of these years are also the best and most delicate for eating and are the ones most sold in the market. In the sixth year they reach maturity and may begin to deposit eggs, although not fully vigorous till two or three years later. How old these snapping turtles live to be is not known. Those one foot and more in length of carapace must be many years old.

"breeding to a point" to perfection, and I have often been interested in hearing some of them talk in a way which reminded me of passages in the "Origin of the Species" or other Darwinian writings. This must be considered remarkable, for these breeders are, as a general thing, without much education, and have obtained all their knowledge from the practical handling of the fish.



The Demé-ranchu

EXTRAORDINARY GOLD-FISH

The gold-fish is the characteristically oriental domesticated fish. Its beautiful bright coloration and graceful form, with long, flowing fins, appeal most strongly to one's sense of the beautiful. It also is intensely interesting from the scientific standpoint, and proves a source of endless surprises to the biologist, for it is a plastic material with which skillful breeding can, within certain limits, do almost anything. Our gold-fish breeders seem to have understood the principle of

The history of the gold-fish is lost in obscurity. Like so many things in Japan, it seems to be an importation from China. There is a record that about four hundred years ago—that is, about the year 1500—some gold-fish were brought from China to Sakai, a town near Osaka. The breed then brought in is said to be that now known as the "wakin." There must also have been several later importations, and the Japanese must have improved vastly on the original forms, as in so many other cases of things introduced from foreign countries.

From U. S. Bureau of Fisheries

Varieties of Gold-fish (from Japanese Paintings)

Of all the extraordinary and odd-looking fishes, the demé-ranchu certainly is far in the lead in many respects, and is interesting as showing how far man can proceed in modifying nature. It is a telescope-fish with a short globular body, without the dorsal fin. The eyes have assumed a most extraordinary position. The ordinary telescope-fish is odd enough, with the eyes protruding, but in this variety dislocation has gone one step further. The eyes have not only started out of the head, but have turned upward 90 degrees, and have their pupils looking straight skyward. For this reason I should be inclined to call this "astronomical telescope-fish." As a fish, it is so monstrous that it gives one almost uncomfortable feelings.

All young gold-fish just hatched are dark in color, the bright colors coming only later. A great deal of experience and skill is needed in making the gold-fish change its color from black to red. If a person who is not an expert tries his hand at raising a lot of young gold-fish he will find to his sorrow that the fish remain black and do not assume bright colors, while those which may be from the very same lot of eggs, but have been under the care of a professional breeder, may have all donned the beautiful hues. The essential points to be attended to in bringing about this change seem to be (1) that the young fish should be given plenty of food; (2) that they should be exposed to the sun's rays and be kept as warm as possible, and (3) that the water of the pond in which the young are kept should be changed occasionally, although sudden transfer from warm to cold water in the middle of the day is to be avoided. The change of color begins in about sixty to eighty days from the time of hatching, and by the middle of August the fish should all have lost the dark pigment and acquired bright colors.

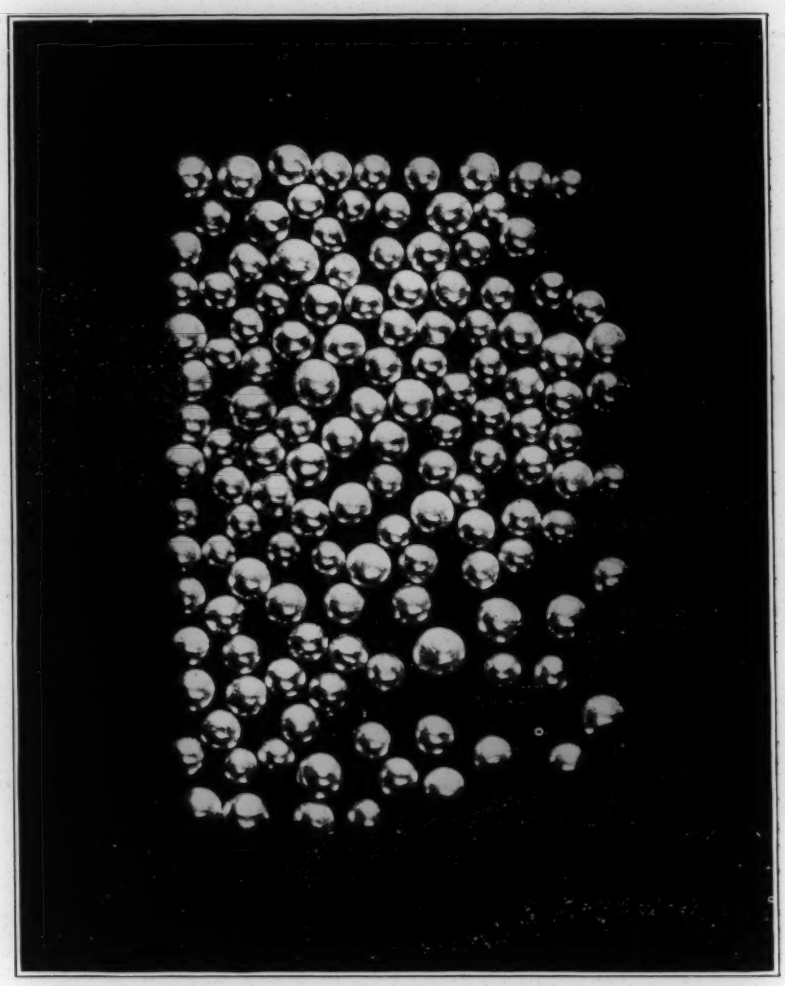
I have just now no available statistics in regard to the output of gold-fish, but the number produced must be millions upon millions. It shows the power of children in the nation, for they are par excellence the customers of these establishments. It is said that in the old regime, even in years when a famine was stalking in the land and hundreds were dying from starvation, there was a tolerable trade in gold-fish, proving the truth of an old proverb: "Crying children and landlords must not be disputed."

THE PEARL OYSTER

Various kinds of pearl oysters are found in the southern semi-tropical islands of Japan, but the only one which is at all common in Japan proper is the species *Avicula martensii* Dunker. This pearl oyster is found more or less along the whole of the coast of Japan, but there are some localities famous for producing it in quantities. Such are Shima, Omura (province Hizen in Kiushiu), Noto, Tosa, etc., and some fine pearls have been obtained from these places.

In 1890 I suggested to a Mr Mikimoto, a native of Shima, who had grown up and lived in the midst of the pearl-producing district, the desirability of cultivating the pearl oyster, and I pointed out to him also the possibility of making the pearl oyster produce pearls by giving artificial stimuli. He at once proceeded to experiment on it. The results have been beyond expectations, and today the Mikimoto pearl-oyster farm, put on a commercial basis, has millions of pearl oysters living on its culture grounds, and is able to place annually a large crop of pearls on the market.

The pearl oyster farm is in the Bay of Ago, on the Pacific side of central Japan, a few miles south of the famous Temple of Ise. The bay, like all in which the pearl oyster grows in abundance, is a very quiet piece of water with a most irregular, highly broken-up coast line full of deep-running inlets, coves, etc., with a depth of 3 to 7 fathoms, and affording most favorable shelter. Somewhat out of the center of the bay to the north there is a little island called Tadoko, where the land part of the enterprise, necessary buildings, etc., are placed, and where



From U. S. Bureau of Fisheries

Culture Pearls, Natural Size

altogether about 100 persons connected in some way with pearl-oyster culture are now living. Around and in the neighborhood of this island a large area of sea bottom, which with several large recent additions now amounts to 1,000 acres, has been leased by Mr Mikimoto.

The breeding season of the pearl oyster is July to August, and before this comes round—namely, in May to June—stones 6 to 8 pounds in weight are placed over the bottom of the spat-collecting grounds, which are generally in shallower parts, penetrating deep into land. By August tiny shells not more than 3 to 4 millimeters long are first discovered, attached to these stones by their byssus, and the number increases steadily with the season. An immense number of shells is collected every year. They are allowed to lie as they are until November, and then those that are too near the shore are removed with the stones on which they are anchored into depths greater than 5 or

6 feet. This is necessary to protect them from cold, from the effects of which they are apt to die in the course of winter if left in the original places. The young shells are then left quietly and allowed to grow for three years, or, better, some may be removed to deeper waters and where they are given more space and get more food, and grow better. At the end of three years, when they are about 5 to 6 cm. across, they are taken out of the water and the operations necessary for inducing them to produce pearls—that is, of putting in nuclei for pearls—are performed on them. At present the number thus operated on in a year is only 250,000 to 300,000. They are then put back in the sea and spread out at the rate of about 30 to every tsubo (6 feet square), and are left alone for four years more. At the end of that time, or seven years and a half from the beginning, they are taken out of the water and opened. Natural pearls, as well as "culture pearls," as I have named those produced from the introduced nuclei, are thus harvested and put on the market.

As in all culture enterprises, there are many enemies of the pearl oyster, as well as unexpected difficulties in the way of its culture. *Octopus, Codium, Clione* (sponges), all sometimes play a sad havoc among the mollusks, but the most dreaded enemy of all is the "red current" or "red tide." This is an immense accumulation of a Dinoflagellata, *Gonyaulax,* causing discoloration of the sea water, and, in some way not well accounted for, causing in its wake an immense destruction of marine organisms, large and small.

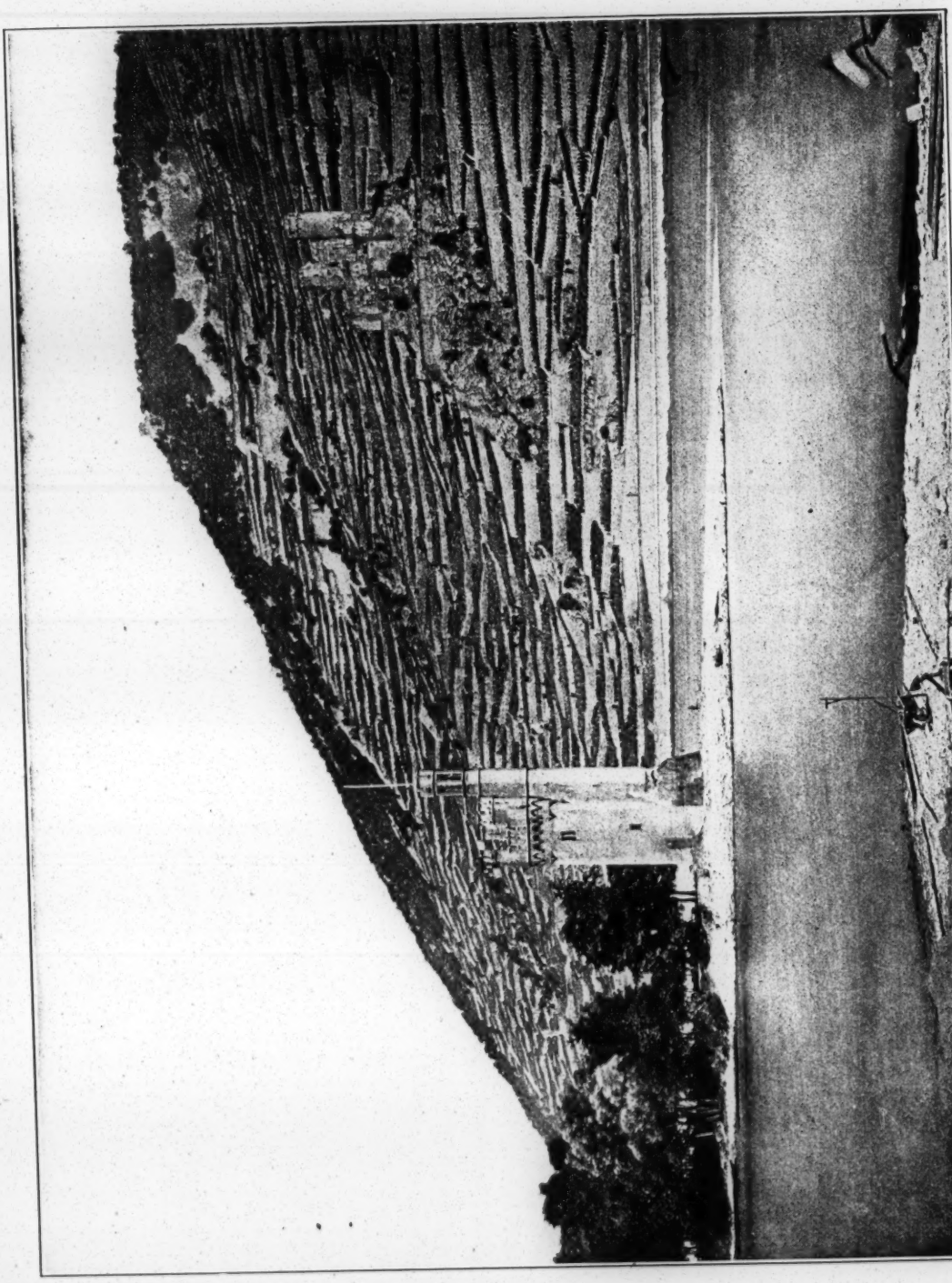
The "culture pearls" are, I regret to say, either half pearls or only a little more than half pearls, but as regards luster, shape, and size, they are beautiful beyond expectations, and meet the requirements completely in cases where only half pearls are needed.

Pearl-oyster culture is still in its infancy, but its promises are bright. If, in addition to half pearls, full or "free" pearls can be produced at will, as there are some hopes, it will be a great triumph for applied zoölogy.

THE LUMBER BUSINESS OF THE GOVERNMENT

A NATURAL feeling among lumbermen toward the forest work of the government is that the government is not in the lumber business and can not, therefore, take the lumberman's business point of view. Yet a greater misconception could scarcely exist. As a dealer in stumpage, the government is the largest lumber dealer in the country. Further, it applies to its sales the practice of scientific forestry, requiring the removal of the timber under the same sort of instructions which it advises for private operators. Thus the Forest Service, in its reserve work, is giving an object lesson on a huge scale to enforce its teachings that conservative management and profit may go hand in hand. In the year 1905 the total sales reached a value of $273,659.82.

The restrictions governing the timber sales, while effective, are simple. Application is made to the local officer in charge of the reserve from which the timber is desired, who executes small sales on the ground. In case of large sales, the application is forwarded to the Forest Service, from which the advertisement of the sale is made. Applicants for timber are required to send sealed bids to the Forest Service. Small bidders enjoy exactly equal opportunities with large, and monopolization is effectually forestalled. The highest bid fixes the price. Should the first applicant desire to begin cutting immediately he may (except in California) do so, on condition that he pay in advance at a price already fixed by the Forest Service, and that he obligate himself to pay the full amount named in the highest bid. Thus delay is avoided and the government is



Terraces of Vineyards on the Rhine, near Bingen

protected. Speculation in reserve timber is made impossible by the provision that the timber must be removed within a specified time, and that when a contract extends over several years a proportionate amount of timber must be removed each year. Five years is the extreme limit of a sales contract.

That these restrictions are not onerous is shown by the numerous sales made under them. A single sale of 50,000,000 feet of lodgepole pine for railroad ties is pending on the Montana Division of the Yellowstone Forest Reserve. It is estimated that 165,000,000 feet B. M. of lodgepole pine can be taken from one watershed in the Medicine Bow Forest Reserve, still leaving a large percentage for future crops. Much timber is sold in small lots; fifty applications for such sales are made to each single application for 1,000,000 board feet or more; the prompt, businesslike consideration accorded such applications standing in marked contrast with the slow methods once prevailing, when all applications had to be made through Washington.

FORESTS AS REVENUE

During the year 1905 the sales of timber from the national reserves were as follows:

The largest sales so far made are 71,466,537 board feet from South Dakota, 68,255,916 from Wyoming, and 5,327,443 from Utah.

In sales of wood for fuel South Dakota led with 29,844½ cords, Arizona followed with 16,649, and Colorado with 10,795½. The total number of cords sold was 74,120.

In sales of posts and poles Montana led with 119,500, followed by Wyoming with 30,750, and Colorado with 13,988. The total number sold was 188,740.

The largest timber sales were made in Wyoming, where they reached $143,894.81. South Dakota's sales ranked second in value, amounting to $78,958.24, and Colorado's to $23,937.07. The total sales for 1905 reached $273,659.82.

Nor are the receipts from these sales swallowed up by the cost of administration. The entire property of the forest reserves, worth $250,000,000 in cash, is now being administered at a cost of less than one-third of 1 per cent of its value, while increase in that value of not less than 10 per cent a year is taking place. As the use of the reserves increases, the cost of administration must, of course, increase also, but receipts will certainly increase much more rapidly. The time is not far distant when the forest reserves will become self-sustaining. Later they may confidently be expected to become a source of public revenue.

A POLAR MAP

AMONG the features of early numbers of the NATIONAL GEOGRAPHIC MAGAZINE are a six-colored map of the regions around the North Pole, 30 x 36 inches, and an illustrated résumé of the United States Eclipse Expedition of 1905, by Rear Admiral Colby M. Chester, U. S. N., with a picture of the corona in four colors.

GEOGRAPHIC LITERATURE

Elements of Geology. By Prof. William Harmon Norton. Pp. 461. Many illustrations and maps. 5½ by 8 inches. New York: Ginn & Co. 1905.

Professor Norton has summarized in a compact form the principal facts of geology. The book is well illustrated and the style comparatively simple, so that the volume will prove eminently useful to those who want a condensed work on geological science.

Italy. By W. Deecke. Translated by H. A. Nesbitt. Pp. 485. Illustrated. 10 by 7 inches. New York: MacMillan Co. 1905.

Professor Deecke gives us a studious account of the country, people, and institutions of Italy, including Malta and Sardinia. The translator has done his work well and the book can be recommended to those who are seeking a comprehensive description of the Italian Peninsula.

The Philippine Islands, 1493-1898. Vols. XXII (1625-1629), pp. 323; XXIII (1629-1630), pp. 299. Illustrated. Cleveland: Arthur H. Clark Co. 1905.

Volume XXII of this valuable publication has special interest from its accounts of social life at Manila, the fostering of educational interests, and the regulation of the Chinese. XXIII contains very extended extracts from Fr. Medina's entertaining and valuable history of the Augustinians in the Philippines.

A. W. G.

Modern India. By William Eleroy Curtis. Illustrated. 513 pages. Fleming H. Revell & Co. 1905.

This is a republication of a series of letters written during the winter of 1903-1904. The author is an experienced traveler who has retained youthful eyes. Wherever he goes, he sees many things overlooked by others, especially by the chronic globe-trotter, and he has a delightful way of serving it up. He tells what one wants to know, and he tells it in a simple but most interesting way.

His journeyings in India commenced in Bombay and ended in Calcutta. The straight trip across was varied by side trips to certain places, as Delhi, Simla, etc., and his itinerary and descriptions of places are varied by bits of history, accounts of Indian institutions and social customs. For an understanding of the surface features of this East Indian people, this book is admirable. H. G.

Problems of the Panama Canal. By Brig. Gen. Henry L. Abbot. Pp. 247. 5½ x 8 inches. New York: The Macmillan Co. 1905.

An excellent history of the French work on the Isthmus, including much useful information on the climatology, the Chagres floods, and the physical geography of the Isthmus.

American Park Systems, by Andrew Wright Crawford, contains an account of the park system of every city in the United States which has begun making parks. The work done is illustrated by a map of each city The little book, which has a patriotic as well as commercial value, can be obtained of the author, 701 Stephen Girard Building, Philadelphia.

Rhode Island. A Study in Separatism. By Irving Berdine Richman. Pp. 495.

Louisiana. A Record in Expansion. By Albert Phelps. Pp. 412.

American Commonwealths. Boston and New York: Houghton, Mifflin & Co. $1.10 net.

Each of the above books gives a good history of the state chosen, but both are inadequate in that they summarize in a few words the last 30 years, and contain practically nothing about the states as they are today.

GOOD BOOKS ON THE WEST INDIES

"Cuba and Porto Rico," with the other islands of the West Indies; their topography, climate, flora, products, industries, cities, people, political condition, etc. Robert T. Hill. Century Co. Illustrated and indexed. $3.00.

"Report on the Census of Cuba, 1899." Lt. Col. Joseph P. Sanger, director, War Department. Government Printing Office. Illustrated. (Out of print.)

"Report on the Census of Porto Rico, 1899." Lt. Col. Joseph P. Sanger, director, War Department. Government Printing Office. Illustrated. (Out of print.)

"Our West Indian Neighbors, the Islands of the Caribbean Sea." Frederic Ober. James Pott. $2.50.

"Storied West Indies." Frederic Ober. Appleton. Home Reading Books: History. Illustrated. $0.75.

"Cruising in the West Indies." Anson Phelps Stokes. Dodd, Mead & Co. $1.25.

"Two Years in the French West Indies." Lafcadio Hearn. Personal Experiences and Impressions. Harpers. Illustrated. $1.58.

"Around the Caribbean and Across Panama." Francis C. Nicholas. H. M. Caldwell Co. Illustrated. $2.00.

"Ancient and Modern Engineering and the Isthmian Canal." This work is the outcome of a course of six lectures delivered at the Cooper Union, in the city of New York. William H. Burr. John Wiley and Son. Illustrated. $3.50.

"Mont Pelee and the Tragedy of Martinique." Angelo Heilprin. Lippincott. $3.00.

"History and Guide to Barbadoes and Caribee Islands." J. H. Stark. $1.50.

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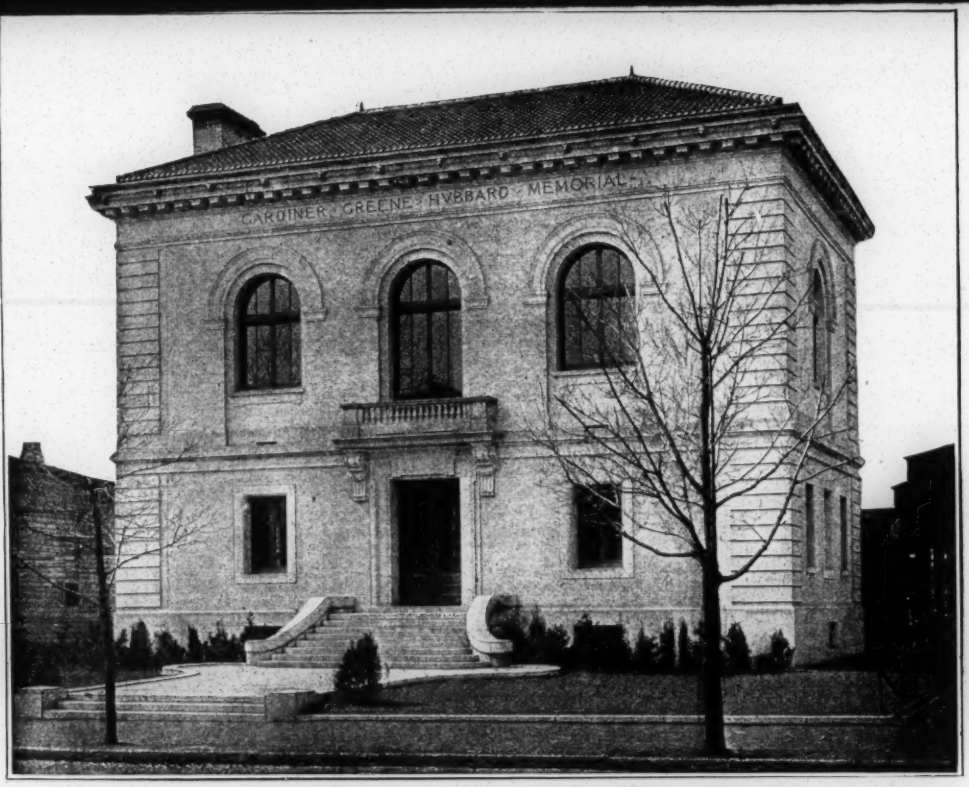

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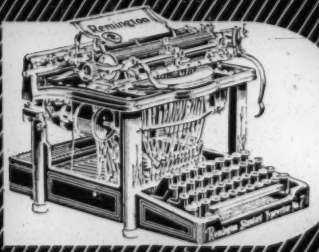

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